East Anglian Library
FEB 10 1925

GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLXIX. No. 3221.] LONDON, FEBRUARY 4, 1925. [77TH YEAR. PRICE 1s.

OXIDE OF IRON
SPENT OXIDE

GAS PURIFICATION AND CHEMICAL CO., Ltd.
PALMERSTON HOUSE, LONDON, E.C.2.
Telegrams: "PURIFICATION, LONDON."
Telephone: 9144 LONDON WALL.

PUMPING ENGINES
All Types for ACID, &c.
CAST-IRON OR STEEL TANKS
Any Capacity.
CHEMICAL PLANT.
Roofs and Girders. Structural Work.
SULPHATE OF AMMONIA PLANT
Air and Gas Compressors.
MIXERS.
TAR STILLS AND CONDENSERS.
W. NEILL & SON, LD.
Engineers, Iron & Brass Founders,
ST. HELENS JUNCTION.
Telegrams: 'NEILL, ST. HELENS.' Telephone No. 20.

Berk will Guarantee.
Sulphuric Acid
made from Spent Oxide, for
Sulphate Making
Telephone Ave 0362. *Telegrams* Berk, London
F.W. BERK & CO. LTD
1 FENCHURCH AVENUE LONDON E.C 3
WORKS AT STRATFORD, E. & MORRISTON, GLAM

"TORBAY PAINT"
FOR ALL PURPOSES.
The TORBAY PAINT CO.,
26/28, Billiter St., LONDON, E.C.
51, Old Hall St., LIVERPOOL.

"BLUEBELL"
SILICA RETORTS
(95% SILICA)
John G. Stein & Co., Ltd.,
Castlecary, SCOTLAND.

Telephones:
8966 VICTORIA.
8967 Do.
Telegrams:
"GASIFICATION, Sowest, LONDON."
WALTER MOORE & SONS,
GAS COAL & COKE CONTRACTORS,
72, VICTORIA STREET,
LONDON, S.W. 1.

JAMES McKELVIE & CO.
Coal Owners,
Gas and Steam Coal Contractors,
17, RUTLAND SQUARE, EDINBURGH.
ASTOR HOUSE, ALDWYCH, LONDON, W.C.2.
GUILDHALL CHAMBERS, SANDHILL, NEWCASTLE-ON-TYNE.
4, CHAPEL STREET, LIVERPOOL.
ESTABLISHED 1840.

W. & B. COWAN
(Incorporated in Parkinson and W. & B. Cowan, Ltd.),
LONDON. MANCHESTER. EDINBURGH. GLASGOW.
SYDNEY. MELBOURNE. BRISBANE. WELLINGTON, N.Z.
(See Advertisement on p. III. of Wrapper.)

STEWARTS AND LLOYDS, LIMITED, 41, OSWALD STREET, GLASGOW. BROAD STREET CHAMBERS, BIRMINGHAM.
TUBES & FITTINGS for Gas, Steam, Water, &c.

R. & J. DEMPSTER,
LIMITED,
MANCHESTER.
LONDON OFFICE:
CONNAUGHT MANSIONS.
34, Victoria Street, S.W. 1.
See Illustrated Advertisement, Centre p. X.

RADIATION
LIMITED.
See Advertisements, pp. 249, 251, 253, and Centre IV., V.

ROBERT DEMPSTER & SONS, LTD.,
ELLAND.
See Illustrated Advertisements, pp. 252 and Centre II.

Costs by using FERNDOWN ELASTIC PAINT twice as long as other Paints. BERMONDSEY, LONDON, S.E. 16.

CHEMICAL PRODUCTS

Benzole, Toluole, Solvent Naphtha, Creosote Oils, Grease Oils, Carbolic Acid, Dark Cresylic Acid. Naphthalene, Pyridine, Anthracene, Refined Tar, Pitch.

Dry Neutral Sulphate of Ammonia, Sulphite of Ammonia, Muriate of Ammonia, Ammonium Chloride, Ammonium Polysulphide, Concentrated Ammonia Liquor, Liquor Ammonia.

Oxide of Iron for the purification of Gas, Sodium Sulphide, Ferric Sulphate, Copperas, Glauber's Salt, Sodium Hyposulphite, Nitre Cake, Salt Cake.

Sulphuric Acid of all strengths.

Intermediates for Dyes.

Manufacturers:

SOUTH METROPOLITAN GAS CO.,

Products Department,

709, OLD KENT ROAD, LONDON, S.E. 15.

Telephone: New Cross 2000. *Tel. Address: "Mstrogas, Peck, London."*

Rose's

PATENT PRESSED STEEL

Expansion Joints

FOR

GAS, AIR, STEAM or WATER PIPES,

any Size or Shape, Single or Multiple

SOLE MANUFACTURERS:

BRITISH APPLIANCES MFG. CO., LTD.,

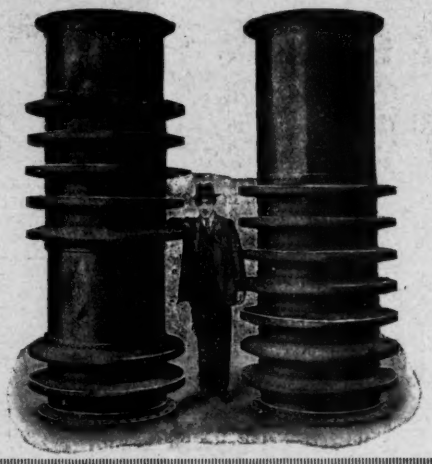
LONGCLOSE WORKS,
Dolly Lane, LEEDS.

STRUCTURAL ENGINEERS,
TANK and BOILER-MAKERS

Hydraulic and Foul Mains, Purifier Covers, Etc.

ENQUIRIES SOLICITED.

Telegrams: "Structural," Leeds. Tel 24271.



PREVENT
Naphthalene Troubles

BY USING AN

OIL SPRAYING PLANT

This apparatus is arranged to give the most efficient quantity of finely divided oil spray in relation to the quantity of gas being used.

The oil is perfectly vaporized, and is carried forward by the gas with a minimum of condensation.

The oil being sprayed by gas, no air or steam enters the mains.

Thorough mixing of the oil with the gas.

PORTABLE PLANTS OR FIXED PLANTS.

Simple in construction. Minimum cost to instal. Cheap to operate and maintain.

A Gas Engineer informs us that since using this Sprayer the number of complaints per month has been reduced from about 850 to 30.

Prices and Particulars on application to—

THE BRYAN DONKIN CO., LTD.

Head Office and Works: CHESTERFIELD.

London Office: 3, Victoria Street, WESTMINSTER, S.W. 1.

MEMBERS OF BRITISH FURNACES Ltd
MAKERS OF GAS FURNACES FOR ALL INDUSTRIAL PURPOSES

CONTENTS.

EDITORIAL NOTES.

Our Legislators and Power and Heat . . . 263
Accentuated Gas Business Building . . . 263
Wanted, a Standard Method for the Testing and Valuation of Gas Coal 265
Statutory Power to Repair Defective Fittings 265
The Miners' "No" 266
Special Order Procedure—Costs of Special Orders—Damping Coke by Retailers—Tar for Road Purposes—The Promoters . . . 266
Smoke Abatement Bill—Fogs and Smoke (Research and Exhibition) 267

Personal 267
Obituary 267
Electricity Supply Memoranda 268
Evening Star Lodge, No. 1719 269
Gas Light and Coke Company—The Accounts for the Past Year 269
Committee on Industry and Trade 270
South Metropolitan Gas Company—Annual Report and Accounts 271
London and Southern District Junior Gas Association—
New Gasholder and Steel Tank at Lea Bridge Gas-Works. By D. Cleave Cross 272
Diffused Lighting Systems—Effect of Internal Obstructions on Performance 274
Economy in Steam Raising—An Air Preheater for Boiler Firing 274
Crankless Engine and Compressor. . . . 275
Transition of Coal to Coke 275

CORRESPONDENCE.

Mr. Wilson's Paper on Complete Gasification by the Tully Method 275
180 Therms in Gas, and no Coke, *v.* 72 Therms in Gas, and Coke 275

REGISTER OF PATENTS.

Cooling Coke—Fülscher, J. 276
Governors—Dobson, E., and Foster Engineering Co., Ltd. 276
Burner for Testing Gas Flames—Helps, G. . 276
Gasholder Framework—Westwood & Wrights 276
Manufacture of Carburetted Water Gas—Glasgow, A. G. 276
Gas Meters—Batt, W., and Cairns, M. . . . 277
Atmospheric Burners—Wilkinson, G. . . . 277
Venting of Gas Cookers—Stimson, E. F. . . 277
Gas Meters for Hotels, &c.—Sutherland, A. G., Ltd., and Mace, B. E. 277
Determination of Hydrogen Sulphide—Humphreys & Glasgow, Ltd. 277
Applications for Patents 278

MISCELLANEOUS NEWS.

Gas Regulation Act Applications 278
Stockton and the Haverton Hill Gas-Works—Ratepayers in Favour of Purchase . . . 278
Ideal Home Exhibition—Fresh Features at Olympia in March 278
Tottenham District Light, Heat, and Power Company—Revision of Standard Price . . 279

MISCELLANEOUS NEWS—(*continued*).

Inquiry at Helston. 281
East Grinstead Gas Order—Road Improvements and Gas Mains 282
Early Experimenters—Historical Information Placed before the Newcomen Society . . 283
Trade Notes 284
Contracts Open. 284
North-East Coast Coal Trade 285
Coal Trade in the Midlands 285
Yorkshire and Lancashire Coal Trade . . 285
Current Sales of Gas Products 286
Stock Market Report 287

PARAGRAPHS.

X-Ray Analysis of Coal—Utilization of Waste Heat 267
Analysis of Gases by Light 271
Koppers' Magazine—Institution of Chemical Engineers—"The Law Relating to Public Service Undertakings"—Gas Workers' Wages—Gas Engine Breakdowns . . . 273
Gas Station Engineers 274
A Memorial to the Late Lord Moulton—Gas for Fish Frying—Municipal Profits and the Rates at Birmingham—Newport (Mon.) Gas Company 275
Dempster-Toogood Verticals for Hebden Bridge—Grading of Brighouse Gas-Workers 281
Progress at Belfast—Improved Gas Cookers—Dartmouth Price Reduction 282
Explosion at Hackney 285
Cheaper Gas at Cardiff 286

"JOURNAL" OFFICE TELEPHONE.

The "Journal" Office Telephone Number is "Central 6055."

For List of "JOURNAL" Advertisers, see p. 291.

To Producers of Benzole

Benzole produced to the N.B.A. Specification has always been of considerable value to Motorists, it increases the usefulness of all grades of Motor Spirit.

A few years ago this fact was not known, neither was it possible for Motorists to obtain Benzole with any degree of reasonable satisfaction.

To-day, **National** Benzole, mixed with petrol is the most popular Motor Spirit because of its greater power and increased general efficiency and is obtainable throughout the country at the same price as No. 1 petrol under the trade title:—

National Benzole Mixture

This popularity is due to the organisation provided, maintained, and controlled by the Producers themselves. All producers or prospective producers should obtain terms of membership from the Producers' Marketing Company.

Sheffield Birmingham Manchester Darlington Southampton

NATIONAL BENZOLE Co. Ltd.
Head Office:
WELLINGTON HOUSE,
BUCKINGHAM GATE, S.W.1

Liverpool Plymouth Bristol Ipswich Rochester

Thomas Glover's Policy
still leads the way.

Our Policy, of supplying only the finest quality of workmanship and materials in New Meters and Repairs of prices based on actual cost, admits of no variation, and will be followed as consistently in the future as in the past.

FOR NEW METERS AND REPAIRS.

¶ Our latest Prices
¶ Our up-to-date Patterns
¶ Our progressive Policy

will be of the greatest interest to you.

Write for particulars.

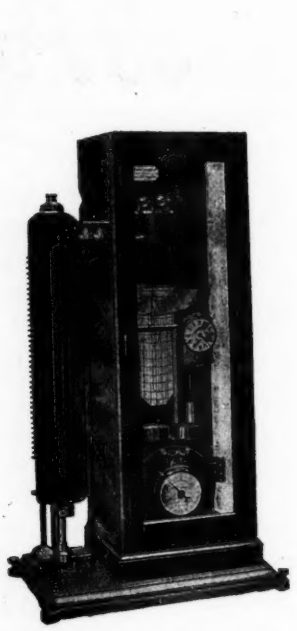
THOMAS GLOVER
and Company Limited.
Original Dry Meter Makers :: Established 1844.
GOTHIC WORKS, LONDON, N. 18, and Branches.
Depot for Australia: 333-5, Queen Street, Melbourne.

PARKINSON'S
RECORDING
Gas Calorimeter
(Beasley's Patents)

IMPROVED PATTERN

FITTED WITH PATENT GAS CONTROLLER (ESCAPEMENT METER) WHICH ENSURES THE DELIVERY OF A CONSTANT STREAM OF GAS INDEPENDENT OF DENSITY AND AT STANDARD CONDITIONS OF TEMPERATURE & BAR. PRESSURE

THIS CONTROLLER CAN BE SUPPLIED SEPARATELY WITH OR WITHOUT THE PRESSURE AND TEMPERATURE CORRECTOR



"GROSS" OR "NETT."

READINGS CORRECTED FOR TEMPERATURE & BAR. CHANGES

CONTINUOUS WATERLINING OF METER.

W. PARKINSON & CO.,
(INCORPORATED IN PARKINSON AND W. & B. COWAN, LTD.)

COTTAGE LANE, CITY ROAD, LONDON, E.C.1.	BELL BARN ROAD, BIRMINGHAM.	MORNINGTON STREET, ORMEAU ROAD, BELFAST.
Telegrams: "INDEX, LONDON."	"GASMETERS, B'HAM."	"PREPAYMENT, BELFAST."
'Phone Nos.: 4270 Clerkenwell	2245 Midland, B'ham.	3374 Belfast.

GAS JOURNAL

LIGHT ⁂ HEAT ⁂ POWER ⁂ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

PROPRIETORS: WALTER KING, LIMITED. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

Telephone: Central 6055. —— Telegrams: "GASKING, FLEET, LONDON."

VOL. CLXIX., No. 3221.] WEDNESDAY, FEBRUARY 4, 1925. [77TH YEAR.

EDITORIAL NOTES.

Our Legislators and Power and Heat.

ONE of the strange characteristics of our legislators is that they take in hand, and pass laws regarding, highly technical matters of which they know little or nothing, without thoroughly comprehensive investigation and advice. In considering the problem of fuel, heat, and power supply, they start with only one aspect of the problem, and pursue it with a fervour which would be better exercised in respect of the whole problem. Power supply and heat supply are so inter-related that the one cannot be properly considered without the other; but succeeding Governments overlook this, and so have become obsessed by the idea that electric power has no association with anything else or with any other problem. The lessons of the World Power Conference at Wembley last year have been lost upon the greater part of our legislators. The present Government have inherited the electrical schemes of their predecessors; and they are considering whether or not they shall proceed with one or more of them. Courtesy and custom demand that they should do this. According to one parliamentary writer, it seems that the Government are anxious to secure some idea of what is in the minds of the representatives of electrical undertakings as to what would be a satisfactory electrical policy; and (we cannot vouch for the accuracy of this) a proposal has been made for the formation of a Committee to consider the matter upon which representatives of the electrical industry should be invited to serve. Lord Weir's name is mentioned as Chairman of the Committee. As an engineer, his Lordship has made a broad study of power and heat problems; and he has been President of the Society of British Gas Industries. He is not, therefore, unmindful of the part that the gas industry takes in supplying the requirements of the country in these respects. He was also one of the prominent members of the World Power Conference, and, therefore, is cognizant of the fact that a generating policy for the electricity industry is merely a part of the question of what should be the policy of the country in co-ordinating the utilization of its fuel resources for the best service of the nation in respect of its power and heat requirements. It is the over-all efficiency that should be the aspiration, and not a partial efficiency. If there is truth in the report as to the intentions of the Government, we could wish, from the point of view of the gas industry, for no more independent and unbiased Chairman than Lord Weir, because he has knowledge which few specialists in any one industry possess.

However, it would be of immeasurable advantage to the country if all members of Parliament had the same knowledge of these matters as Mr. Reginald Clarry, member for Newport (Mon.). If they had, the Government would be compelled to deal with the problem of power and heat solely from a national point of view rather than the narrow one of assisting a single industry. Mr. Clarry, in a letter to "The Times," says it is unfortunate that the development of our electrical resources should have lately become the subject of political party promises, without due regard to economic facts and the anomalies and injustice of State aid to any individual industry. There the position is summed up in a nutshell, though we would at once (as Mr. Clarry does later) emphasize in addition the national view of the matter. Writing with a wide and varied experience in the use and conservation of coal, Mr. Clarry remarks that he has long since come to the conclusion that we have not fully appreciated the true value of the asset of our coal resources, or laid ourselves out to practise economy on broad and general lines to the national advantage. "Neither have we realized the potentialities of the hun-"dreds of gas undertakings—always to be found near "every centre of population or industry—in aiding the "rational development of electricity." This being so, then any consideration by a Committee of future policy in relation to electrical development ought, without any hesitation, to be made comprehensive of all potential and material factors which have relation to the question, and to the larger one of making the best and most efficient use of our national resources. Any partial treatment at this time of this large matter will only leave to the future the solution of many attendant problems, and would simply add to the difficulties of ultimately bringing about that co-ordination in the utilization of fuels through which alone the maximum economy and efficiency in respect of our chief national resource can be realized. In his letter, Mr. Clarry points out that the highest form of coal conservation is undoubtedly found in gas-works practice; and a comparison is made of the relative efficiencies of the electricity and gas production processes. Our readers know well the data, so that there is no need to reproduce them, and they are also aware of the potentialities resident in the products of gas-works practice, including the utilization of waste heat. The gas industry has made large progress not only in its practices but in its ideas, which are materializing fast in respect of the advantageous employment of waste heat, and to a less degree, but still favourably, in the direction of combining the generation and supply of electricity with the ordinary work of gas manufacture. We have not by any means come to the end of the developments which are latent in the operations of a gas undertaking. The suggestion has been made before—it is again advanced in Mr. Clarry's letter—that all the gas-works established and scattered in the country could be made the sources of electricity generation for feeding into a network of distribution mains. How far this is economically feasible cannot be said without exploration.

However, no Government ought further to play about with the electrical section of what is a large, important, and economically fecund question for the nation. Therefore we hope that, if it is contemplated to have another Committee to consider electricity generation policy, the reference may be broadened so that the entire ground may be thoroughly covered and investigated and new light be given to our politicians in the interests of the whole country.

Accentuated Gas Business Building.

EXAMINING the accounts of the Gas Light and Coke Company for the past year, there are two features which particularly arrest attention. One is the material evidence there is of the year having been a remarkable one in respect of the growth of the gas business. This evidence is found in the sales of gas, the claim upon capital that this involves, and the increasing number of gas-heating appliances sold or let on hire. The other point is that coke has done better than we imagined might be the case; but the other secondary products have not served the Company or the consumers so well as they were doing previously.

The Directors state in their report that the sale of gas shows an increase of 6½ p.ct.; that there has been an addition to the number of consumers of 15,016, which is

more by 3726 than the accretion of 1923; and that the increase in the number of gas stoves sold and let on hire is 85,322, which overlaps the not insignificant figure of 1923 by 18,069. That is highly gratifying. It is numerical evidence which will give confidence to investors in gas stocks and shares, because it shows that gas has risen, and is rising, in the estimation of the public; and this is proof that the gas industry in its propaganda work has not exalted the merit of gas beyond a level which can be justified by experience. Referring to the capital account, one sees that all this new business—the magnitude of the Company's operations must be remembered—necessitates a substantial expenditure of capital. Apart from works requirements, it is noticed that new and additional mains and service-pipes called for an outlay of £144,669 (against £73,667 in 1923), meters £72,493 (as compared with £66,311), and stoves £176,930 (as against £139,461). On the other hand, it is observed that the rental of meters last year totalled to £227,623—an increase of £6866; rental of stoves, £288,177—an increase of £35,314; and rental of fittings, £380,916—an increase of £37,366. The increases in these three items aggregate £79,546. We turn to the statement showing the gas sold, and find that the volume consumed last year reached the figure of 36,504,917,000 c.ft., or 3,092,962,000 c.ft. more than in 1923, or therms at the actual calorific value (502 B.Th.U. per c.ft.) 183,215,068—an increase of 15,528,770 therms. There is, however, a note at the foot of the statement which shows that an adjustment has been made in the "accounted for" gas for the year 1924 in respect of temperature and pressure; and this adjustment no doubt accounts for the difference between the 6½ p.ct. already mentioned as representing the increase in the year's output and the increase as calculated from the figures shown. All this shows the supremely fine security possessed by the gas industry; and another strong support to that security in the case of this Company is the fact that the workers and the public have had practically all the advantage of the additional prosperity. It has meant continuous, and an increasing volume of, employment to the former; while as to the public, the price per therm was reduced from 10d. to 9·2d. at the end of the March quarter of 1923, and again to 8·6d. at the end of the June quarter. Therefore, while 10d. and 9·2d. per therm each ruled for three months in 1923, 8·6d. has applied to the whole of 1924. The result of this is reflected in the revenue from gas. The total income from gas was £6,279,608 last year, or £1785 less than in 1923. The receipts for private consumption were £6,096,573, or only £8685 more than in 1923. In other words, the gas sold for public lighting and under contract produced £10,472 less. Our trade union friends should make a note of this condition: Though the Company prosper in the increase of gas business, the public—including the prepayment consumers—and the workers, through increased employment, are in the circumstances reaping the benefit.

That is the brightest side of the year's business; and it augurs well for the future. There is the other side. In the accounts there is illustration of how the gas business is subjected, just the same as any other commercial business, to influences external to itself, and over which there can be no, or little, control by the administration. Take the secondary products. These illustrate that by good management the Company secured a larger revenue from coke than in 1923, which is not the case with all gas undertakings. Quantitatively there was a decreased sale—1,077,711 tons, compared with 1,101,254 tons; but the total revenue was £1,774,325, or an increase of £179,951. Dividing the income from coke by the tons made for sale, we have an average for the year of £1 10s. 10d. per ton, as against £1 8s. 11·4d. in 1923. Breeze brought in £141,926, or £49,740 more. The increased receipts on coke and breeze together gave an additional £229,691; but this advantage was wiped out with the exception of £41,898 through the reduced income—amounting to £187,793—from tar and tar products and ammoniacal liquor and sulphate of ammonia. In yielding £390,674, tar and tar products gave £117,703 less than in 1923; and ammoniacal liquor and sulphate, in bringing in £139,461, contributed less by £70,090.

The £41,898 less received from secondary products, together with an average cost for coal (including all expenses thereon) of something like 6d. per ton more, and an additional 137,174 tons (the total carbonized was 2,192,291 tons) required to help to meet the increased business, naturally made the net cost of coal more than in 1923. The expenditure on coal was £3,228,209, or £253,682 more. Deducting from the gross cost of coal the revenue from secondary products, we have a net cost for the year of £781,822, as compared with £570,039 in 1923—an increase of £211,783. The oil used in the manufacture of carburetted water gas amounted to 11,784,916 gallons, or 1,095,485 gallons more than in 1923. The expenditure on oil was £168,619, or an increase of £14,238; while coke for the manufacture of water gas cost £310,271, or more by £15,148. Thus the gross increase in the expenditure on manufacturing materials was £283,068, and the net increase £241,170. Including all the other ordinary items under the head of "Manufacture of Gas," the expenditure came to £5,500,744, or more than in 1923 by £36,961; but this was only brought about by the lessened charge for repair and maintenance of works and plant—£1,323,104, or less by £257,962 than in 1923. The total amount of gas made was 39,369,309,000 c.ft., or 197,591,214 therms at the actual value of 502 B.Th.U. The increase in make was 2,798,390,000 c.ft., or 14,048,731 therms. Deducting the carburetted water gas (10,659,272,000 c.ft.) from the total gas made, it is found that 28,710,037,000 c.ft. of coal gas were manufactured; and dividing this by the tons of coal carbonized, we have the make of 13,095 c.ft. per ton. This is excellent working. It is an increase of 176 c.ft. upon the average per ton in 1923; and 176 multiplied by 2,192,291 tons of coal, give a make higher than it would have been on the 1923 yield basis of 385,843,216 c.ft., or 1,936,932·9 therms calculated on the actual calorific value. The good working helped materially to counteract the adverse influences of the markets. Speaking of good working, the accounts also show how exceedingly uniformly it is possible for gas undertakings to work under the therm system. The actual calorific value of the gas was 502 B.Th.U., which discloses close working to the declared value of 500 B.Th.U. That is about as fine a margin between actual and declared values as one could well get. We have this uniformity also illustrated in the consumption of oil per 1000 c.ft. of water gas made—1·1 gallons, as compared with 1·06 gallons in 1923. It has already been mentioned that the increase in the total make of gas was 2,798,390,000 c.ft., of which 2,159,222,000 c.ft. were coal gas, and 639,168,000 c.ft. carburetted water gas.

Reverting to the expenditure side of the revenue account, it is seen that distribution expenditure amounted to £1,582,550, or £84,554 more than in 1923. Under this heading the most striking item is that of repair and renewal of stoves, £455,581, or an increase of £69,318. Besides those previously noticed, there is no other really notable change on the expenditure side. The total expenditure was £8,268,856, or £124,086 more than in 1923. On the opposite side of the account, the income amounted to £9,645,595—an increase of £122,014. This increase was short of the addition to expenditure by £2072. Therefore, the balance to net revenue account (£1,376,739) is less by that amount. After meeting the dividend on preference and maximum stocks, paying a dividend for the second half-year at the rate of £5 6s. 8d. p.ct. per annum, and carrying a further sum of £20,000 to redemption fund, which items will require £585,680, there will be left £223,583 to be carried forward to the credit of the current year, or a reduction of £3712 upon the amount brought into the accounts last year. It is interesting to observe that the total amount paid in wages last year by the Company was £2,312,551, while the interest and dividend on the capital used in the business which gives the employment is £1,291,513, and part of this dividend goes to the employee co-partners.

While the accounts are highly interesting in their revelations of the gigantic undertaking, perhaps the most absorbing feature of the meeting of the proprietors on Friday will be the information that the Governor (Mr. D. Milne Watson) will have to lay before them regarding the proposed transfer of the Brentford Gas Company, which will be, if approved by Parliament, the largest individual amalgamation on record.

Wanted, a Standard Method for the Testing and Valuation of Gas Coal.

IN last week's "JOURNAL," a paper on the testing and valuation of gas coal was given in the report of the proceedings at the last meeting of the Yorkshire Junior Gas Association. It is hoped the paper will be read by many senior gas engineers, as well as by the juniors. Unfortunately, the author—Mr. F. J. Jackson, of the Neepsend Gas-Works, Sheffield—was unable to be present; and, therefore, the discussion on the paper was deferred to the next meeting. In the early part of the contribution, the industry in effect stands charged with carrying on its scientific work in a more or less perfunctory sort of way, and, therefore, of realizing results from its carbonization of coal—viewing the industry as a whole—with which there can be little feeling of real satisfaction. Even though the products—from the gas onwards—are examined with great care, the anomalous state of things exists that the raw material from which they are derived is not in many works treated to any thorough investigation, so that its value can, from the point of view of the whole range of products, be interpreted with any degree of certainty. The author admits that conditions vary considerably on different works; but we fear he is right when he says that few (if any) gas men can say to within 10 p.ct. what lies latent in the coal at disposal. This being so, he submits that, until our position in this respect is strengthened, it cannot be asserted that we are advancing on truly scientific lines. That is true. It is a strange reflection that this weakness in our operations should be at their very root, and therefore fundamental. The rectification of it on properly formulated and acceptable standard lines would give to the operations on the works a vastly greater measure of control than now exists. There are works—particularly the large ones—where there is a systematic examination of coal both in the laboratory and in working-scale experimental plant; but nothing in the nature of recognized standard methods prevail for doing the work. If there were, then we should get to a basis of comparability which would be highly valuable to the industry, both technically and commercially. Last year Mr. E. V. Evans, in the Cantor Lectures, commented on the value of the therm system in determining and controlling carbonizing efficiency, and emphasized the fact that knowledge of the therm value of the products alone does not definitely carry us far without a positive knowledge of the therm value of the coal. A standard, and (as far as possible) universally applied, method of coal testing and valuation would save much of the inconclusive comparison which is now made of carbonizing results. Even gas engineers have been known in papers and discussions to make comparison, and base opinions upon results from the same type of plant, on the therm value of the gas alone, leaving out of consideration all the other factors that have to be taken into account—including coal, coke, and tar. And, of course, there is not only thermal efficiency to be considered, but economic efficiency. A gas engineer, with a coal that does not show a high thermal value, may be working with good thermal efficiency for that coal, and an economic efficiency superior to an engineer using a higher class of coal which, delivered, costs him much more.

From many points of view, there are the strongest of reasons for the gas industry prescribing standard methods, with standard lines of data, on which testing and valuation of coal for gas-making purposes should be conducted. Of course, it would be impossible to define all conditions—for instance, temperatures, seeing that the temperatures required for the best therm and other results vary for different coals, and different plant and modes of operation. But a strong case can be made, as is made by Mr. Jackson, for coal testing in the gas industry being as far as practicable laid on uniform and truly scientific lines. The tendency is in that direction in other fuel industries. For example, as the author points out, the blast furnace and coke oven industries have come to an agreement whereby coke is bought and sold on what really amounts to a fixed carbon basis; and the coal world is already beginning to talk in terms of B.Th.U. and calories. There may be an inclination to smile over the author's suggestion that in the future we may have Coal Referees, and a prescription by them of a method of coal testing. Yet in the time of the Labour-Socialist Government, the Minister of Mines was looking into the question of how he could protect the public from an undue proportion of incombustibles in coal, and the London County Council have had the matter under consideration. When the minds of the authorities turn to a subject in this way, one does not know what developments may take place. Perhaps Mr. Jackson is more serious as to his forecast of Coal Referees than we imagined from the reading of the passage in his paper. But following up his idea of the institution of such Referees and a prescribed method of coal testing, he says it may fall upon the present juniors to voice the opinions of the gas industry when this work is compiled. And then proving that he is serious, he categorically asserts: "This "is a situation which will confront us before many years "are passed; to-day finds us unprepared, owing to the lack "of standard methods of the estimation and valuation of "gas coals."

The author next draws attention to what is required of a gas coal; and in this connection he holds that, if the highest plant efficiencies are to be attained, and if we are to be prepared to meet a new system of buying, our coal must be subjected to more severe tests than in the past, and the information applied to draw comparison between quality and price when contracts are being made, and to satisfy ourselves that contract conditions are closely maintained. His prescription for a complete examination of the coal looks rather formidable; but for works routine it is reduced, and the more exacting part is passed on to the research departments. Where none exist, the work assigned to them will be more or less abandoned. Last session Mr. C. H. Chester read a paper before the same Association in which he dealt with the laboratory examination of coal. Therefore, on this occasion Mr. Jackson confined himself to a description of the work carried on in connection with the coal experimental plant at the Neepsend Gas-Works. We will not enter into the details here. Our readers had them last week, together with interesting data drawn from the tests with different coals. A question that arises is: Even with the exactitude with which the coal testings are made at Neepsend, does the employment of cast-iron retorts and the temperatures which they will stand, fairly represent the conditions to which the same coal will be subjected in daily working? However, although the results are not directly comparable with ordinary working, the results of the testings of different coals will, of course, be comparable. But the cubic feet of gas made per ton and the calorific value per cubic foot materially depart from the results in ordinary horizontal working, just as the results do between different types of plants—horizontal and vertical.

The main matter of general importance in the paper is the plea for a standard method of coal testing and valuation, and presentment of the data. It is a subject which is worthy of the earnest attention of the industry.

Statutory Power to Repair Defective Fittings.

THE chief officials of gas undertakings are in these days very much on the alert as to all movements appertaining to the question of the inspection of fittings and the correction of any that have been found defective. The matter, has been undergoing development for some years; it is not a modern topic. All that is modern about it is the stronger insistence that inspection, prescription, adjustment, and repair are right elements in an advancing policy for the protection of valuable interests. There were officials who some years ago advocated passing from a state of torpor to activity in these things. Sporadically, powers of prescription of piping and inspection have been introduced in Private Gas Bills. The Gas Regulation Act insists on the adjustment and regulation of gas-consuming appliances on a change of calorific value. Then there came the agitation which led to a conference at the Board of Trade offices, at which the question was again brought forward; and later on Mr. Butterfield's report urged the formulation of an acceptable scheme with the view of ensuring the maximum possible safety. Specification of piping, inspection, regulation, and conditional maintenance together constitute not only a means of making still safer a service which statistics prove is relatively free from mishap, but one of the best methods of ensuring the satisfaction of

the consumer. The Rochdale Corporation are not disposed to wait for any general powers to deal with the matter of defective gas equipment. In the Bill which they are promoting in Parliament (as seen in the review of the Bills which we have already published), they are seeking the authority of Parliament to powers enabling them to take a most sensible course of action. What they are suggesting is that if, in their opinion, waste of gas, or injury or risk to person or property, is likely to be caused by any defect in any gas fitting or appliance belonging to a consumer, it shall be lawful for them to repair the defect without being requested to do so, and all expense incurred is to be recoverable from the owner or occupier. A very proper proviso is attached. It is to the effect that, except in cases of emergency, the Corporation are not to enter any house or private premises for these purposes, unless they have given notice to the occupier, and in any case where the fitting or appliance is repairable by the owner, not less than twenty-four hours' notice to the owner of their intention. The power will be, if sanctioned by Parliament (and we see every reason why it should be), of considerable value to the gas undertaking, and of no less value to the gas consumers in the interests of safety and efficiency.

The Miners' "No."

THE well-meant effort of the Council of the Mining Association to get the Miners' Federation to join them in investigating the causes of depression in the coal industry, and to report as to the remedies necessary to a revival of trade, has been met by a polite but firm refusal to participate. At an interview between the Council of the former and the Executive of the latter last Thursday, Mr. Herbert Smith, the President of the Federation, said his Executive declined to accept the invitation to form a Joint Committee; but they were willing at any time to hear what the owners have to say, and to consider any proposals they wish to make. That is a disappointing attitude. It does not disclose any desire to assist in ascertaining the causes which are depressing the industry, and incidentally producing unemployment and an increasing incapacity to obtain more money to satisfy the inordinate demands of the miners for higher wages for the low average amount of work performed per shift. It would be interesting to know the reasons for this attitude on the part of the Miners' Federation. One can only assume that they know full well what is at all events one of the causes for the depression, but it would be repugnant to their policy to make any public recognition of the fact, as this would demand their assistance in removing the cause. There is, of course, knowledge that the Executive of the Federation are opposed to lengthening the working shift to secure more production, and so lower the costs per ton; we have the avowal of Mr. Smith that the miners will not consider any proposal for restoring the eight-hour shift, nor will they accept any revision of the present wage rates—meaning, of course, in the lower direction. We do not understand that the owners have any idea of reducing the wages per shift; but the amount of coal raised per shift at present renders the cost per ton such that buyers abroad are not prepared to pay the price while they can get cheaper supplies elsewhere. Furthermore, it is perfectly clear that, with the end of the present agreement in view, the Miners' Federation are after more pay for no more output per man-shift. It is equally plain that the industry cannot stand that; but the Miners' Federation do not wish to be parties to any investigation which they know could only have the issue of proving that this is so. Hence the positive "No." But that "No" is not big enough to hide facts that cannot be refuted.

Special Order Procedure.

When Parliament dissolved last November, the Special Committee of the House of Lords who were considering procedure in connection with Special Orders under section 10 ceased to function. The Committee have been reappointed. No decision has yet been come to by them on the subject, and they are therefore willing to consider further statements from parties who have not hitherto submitted suggestions. The House of Lords reassembles on Feb. 10.

Costs of Special Orders.

The National Gas Council would be pleased to hear from any gas undertakings which have been allowed by the Inland Revenue Authorities, in respect of income-tax, a portion of the costs of obtaining Special Orders.

Damping Coke by Retailers.

It will be remembered that a short time ago the London County Council had an inquiry respecting the misdeeds of some retailers of coke in giving short weight or measure; and they thought that there should be general legislation compelling coke to be sold by weight. Incidentally, too, they made inquiries as to the possibilities of retailers adding water to the coke, so as to increase its weight. Many provincial local authorities have obtained power to protect the public against fraud by coke retailers; but we do not remember one ever including in their statutory powers a clause regarding the wilful damping of coke by retailers. Thus it may be that the Burnley Corporation, in the Bill they have before Parliament, are creating a precedent in respect of the deliberate adding of moisture to coke. The clause was given *in extenso* on p. 142 of the "JOURNAL" for Jan. 21. Briefly it provides that if a seller of coke wilfully makes any false statement as to the weight of the coke in any sack, or wilfully increases such weight by damping the coke, or does any other act by which the purchaser of the coke shall be defrauded, or obstructs any weighing or re-weighing or measuring or re-measuring authorized by the section, he shall be liable for every offence to a penalty not exceeding £5. Even if the deliberate adding of moisture to coke is not a common practice by a certain order of retailer, it might become so; and the existence of a clause such as the Burnley one might have a salutary effect. At any rate, the gas industry does not want its coke degraded by any such proceeding.

Tar for Road Purposes.

In the supply of tar for road purposes, it is most desirable that there should be adherence to the tar specification of the Ministry of Transport. Some tar supplied by certain gas undertakings has been found unsuitable; and this has reacted to the detriment of tar producers. The bitumen interests have been taking advantage of this.

The Promoters.

Our contemporary, "Electrical Industries"—in an article headed "Investments not Recommended"—calls attention to the unremitting energy of the coterie of promoters, with headquarters at 43, Cannon Street, in trying to unload their precious "securities" on the public. It gives a list of electrical concerns that have been "promoted" by these people. Here it is: Chagford and Devon Electric Light Company, Ltd., Barford Electric Supply Company, Ltd., Wareham Electric Supply Company, Ltd., Lighting and Power Finance Corporation, Ltd., Electricity Finance and Distribution Corporation, Ltd., Warwickshire and South Midland Electricity Supply Corporation, Ltd., Electric Light and Power Contracts Finance Corporation, Ltd., and Electricity, Gas, Share Debenture Investment and Guarantee Trust, Ltd. After each Company, the names of the Directors and officers are given; and it is interesting to observe the distribution that has been made of the same men in the various concerns. We have recently noticed the issue of fresh appeals for subscriptions of capital in one or other of the companies. A correspondent sends us a copy of the re-issued Wareham prospectus that he has just received, in which a supply of preference shares, debentures, and ordinary shares is offered. Application is invited for the ordinary shares at 10s. each; and, as previously pointed out, tucked away towards the end of the body of the prospectus, the information is given that the ordinary shares have a nominal value of 1s. each! We have also received another copy of the prospectus issuing further capital—thousands of pounds—in the Electric Light and Power Contracts Finance Corporation, Ltd. Among the items offered are founders' shares at 10s. each. These, too, are of the nominal value of 1s. each. We have dealt with these impudent documents on former occasions. Our great regret is, holding shares in gas undertakings, and knowing the extent to which these documents are distributed among gas shareholders, that

nothing is done to warn them against investing in concerns about which they know nothing, until inquiry is made in some authoritative quarter. The Secretary of a small but long-established gas undertaking recently told us that he feared that one influence of these promotions would be to make it difficult for genuine but small gas undertakings to obtain further capital when they require it.

Smoke Abatement Bill.

It will be remembered that useful amendments were made in the Smoke Abatement Bill when it was before the House of Lords last year; but the progress of the measure was delayed, and was in an incomplete stage when the dissolution of Parliament occurred. It will also be within recollection that recently the new Minister of Health stated that the Government contemplate the introduction of a fresh Bill, but that there is little chance of this in the present year. The Public Control Committee of the London County Council feel disappointed over this. They point out that the form in which the 1924 Bill was left made it acceptable both to representative organizations interested in smoke abatement and to the trade organization concerned in the matter. In view of the fact that the Bill was almost an agreed measure, and that substantial progress had been made with it, the Committee have asked the Minister of Health to reconsider his decision and to introduce a new measure in the present session.

Fogs and Smoke—Research and Exhibition.

The heavy fogs which in recent times have become increasingly prevalent throughout the country are engaging the attention of the research departments of a number of manufacturing firms, particularly in industrial areas where smoke problems are often acute. With a view to counteracting as far as possible the physical and monetary loss caused by these visitations, the research is being conducted in two main directions: One branch deals with the discovery of more effective means of securing smoke abatement; the other, with devising new appliances and apparatus for minimizing the economic effects of fog in factories, business premises, and the home, and for use in connection with transport by railway, road, sea, and air. Some firms have the advantage of considerable experience in these or kindred matters; and it is believed that intensive study of the dual problem, such as is now taking place, will achieve a great advance on methods at present employed. It has been arranged that the practical results of this organized research and experiment shall be demonstrated to the public at a special International Smoke Abatement Exhibition to be held later on at Bingley Hall, Birmingham, under the auspices of the Smoke Abatement League. This course is approved by prominent firms taking part in the movement, and a representative Committee of experts is now in course of formation. It has also been decided that during the exhibition a series of important conferences shall take place, covering every aspect of smoke abatement and remedial measures in periods of fog.

X-Ray Analysis of Coal.—One of the latest developments in the analysis of coal is the application of the X-ray. The work is performed by an instrument called the "carboscope," which consists of an oil-immersed static transformer and a Coolidge X-ray tube. A 220 volt current is increased by a transformer in secondary circuit to 60,000 volts. On top of the box containing the apparatus is an ordinary fluorescent screen. "Pine" coal under the rays throws a light transparent shadow, while the "dirty" or "ashy" substances give a clear black outline. Samples of coal and shale are readily distinguished, the former showing a greater or less density according to their ash content, while the shale is black. Particles of dirt in a piece of foundry coke are equally distinguishable. It is claimed that it will no longer be necessary to submit coal samples to lengthy chemical analysis. A specimen of coal can be placed under the screen alongside an aluminium penetrometer—a wedge-shaped contrivance whose X-ray shadow varies from a light colour at the apex to dark at the base. This can be calibrated for standard ash contents of coal samples of a certain weight and thickness; and a criterion is thus available. The difficulty of X-ray analysis as applied to coals is that the sample examined has to be very small indeed. Even in ordinary analysis there is great difficulty in obtaining a really representative sample of a large consignment of coal; and this uncertainty is many times magnified when the amount of coal examined is infinitesimal when compared with the bulk sampled.

PERSONAL.

The South African Lighting Association, Ltd., have appointed as Engineer and Manager of their works in Port Elizabeth Mr. PENRITH C. CLEASBY, who was for nearly fourteen years Engineer and Manager of the Guildford Gas Light and Coke Company, which position he resigned some two years ago on account of ill-health. He was trained at Halifax, where he spent eight years, becoming afterwards Assistant successively to the Nelson Gas and Electricity Department and the Ramsgate Gas and Water Department. During the war he was an Honorary Supervisor for the Ministry of Munitions, High Explosives Department.

The Blackpool Corporation Gas Committee have received the resignation of Mr. DOUGLAS FORBES IRVING, Assoc.M.Inst.C.E., their Assistant Gas Engineer and Manager, on his appointment to the position of Engineer and General Manager of the Leatherhead Gas Company. Mr. Irving, who has been at Blackpool some eighteen months, is the eldest son of Mr. Daniel Irving, and was educated at Bristol Grammar School and University—taking at the latter the full course of civil engineering. He was then articled to his father, and received a practical all-round training at the works of the Bristol Gas Company. Two years as General Assistant to the Company were followed by three years as an Assistant Engineer to the Bournemouth Gas and Water Company. Next came a period as Resident Engineer to the Woodall-Duckham Vertical Retort Company, and some time as Assistant Engineer and Manager to the Torquay Gas Company. On the outbreak of war, Mr. Irving was given a Commission and served in Burma and India. In April, 1921, he was appointed Shift Engineer at the East Greenwich Works of the South Metropolitan Gas Company, and went from there to Blackpool.

Mr. ERNEST W. WILSON has resigned the position of Engineer and Manager of the Swadlincote Urban District Council Gas Department, which post he has held for the past four years. During this period part of the works has been reconstructed and brought up to a state of efficiency, and the unaccounted-for gas has been reduced by one-half.

The Burton-upon-Trent Town Council, at their meeting last Wednesday, had under consideration the salaries of chief officials and their deputies; and the result of their deliberations was to make the salary of Mr. WILLIAM WILSON (the Gas Engineer and Manager) up to £1000 per annum at April 1, 1926, while that of Mr. A. T. BUXTON (his Chief Assistant) is increased at April 1 next to £400 per annum.

On the 23rd ult., at Scunthorpe Congregational Church, the marriage took place of Mr. Claude C. Sidaway to Miss Kathleen Denman. Mr. SIDAWAY is Assistant Manager to the Scunthorpe and Frodingham Gas Department.

Mr. H. D. MADDEN, Engineer and Manager of the Cardiff Gas Light and Coke Company, has been appointed a Governor of the University College of South Wales and Monmouthshire.

OBITUARY.

We regret to learn from Mr. C. H. HOLLAND, of Tinsley, near Sheffield, of the death of his father on the 6th ult. The late Mr. Holland was one of the oldest readers of the "JOURNAL," always taking a very keen interest in the affairs of the gas industry.

The death has occurred at Seaham Harbour, at the age of 58, of Captain HENRY SHILLING, who during the war, while master of a collier, sank a German submarine. He was awarded the Distinguished Service Cross, a Commission in the Royal Naval Reserve, and a valuable money prize. At the funeral the mourners included Major F. J. Bywater, Chief Superintendent at Newcastle for the South Metropolitan Gas Company, in whose vessel the "Bermondsey" Captain Shilling last sailed. Wreaths were sent by the Company from both London and Newcastle.

Utilization of Waste Heat.—In the course of a letter to "The Engineer," Major W. Gregson (General Manager and Director of Spencer-Bonecourt, Ltd.) says: "There seems to be a general impression that water or tidal power is the cheapest source of electric energy. As a matter of fact, waste heat produces power at a much lower figure, as the capital charges on a complete waste heat recovery scheme are far less than those of water power installations with their expensive headworks. Furthermore, waste heat occurs in the manufacturing districts—*i.e.*, where electrical power is most required; hence transmission costs are lower. . . . The full utilization of the waste heat from the gas undertakings of London and Greater London on a proper basis would result in sufficient surplus electrical energy—after all works requirements were satisfied—to operate London's Underground Railways. In our big industrial centres the presence of coking plants and furnaces of all types makes the proposition even more attractive as a local source of cheap electricity."

ELECTRICITY SUPPLY MEMORANDA.

THE Government, since taking charge of our national and imperial affairs last November, have been investigating the heritage of electrical schemes from their predecessors. We do not know how far the Parliamentary Correspondent of the "Daily Telegraph" gets behind the political scenes, or how much he enjoys the confidence of the Government; but anyway he states that there are two schemes still in existence, which we take to mean that they have not yet been thrown on the lumber heap. Evidently the Government are in a bit of a quandary, and do not know quite what to do. There can be the most generous concurrence with the Parliamentary Correspondent that the question presents many difficulties. Consideration is now being given to the practicability of inviting the heads of the more important electricity undertakings to take part in a conference for the purpose of arriving, if possible, at an agreed policy. The name of Lord Weir, it is stated, is mentioned in connection with the chair, assuming it is found possible to arrange a conference. If the representatives of important electricity undertakings can get such an opportunity to speak openly and frankly to the Government, they will, we should imagine, tell them politely but firmly that all they wish is to be left alone, and to be done with all the political meddling experienced the past few years with the natural course of development, with, however, an abortive effect, which many hold to be excellent.

To Take Counsel.

The Union Autocrats.

The Electrical Trades Union have previously proved themselves despots of the very front rank; and they are determined to continue to justify the title. They attempt to bind and grind everybody down to conform to their decisions, if there is not strict obedience to them—no matter that the people who suffer have nothing whatever to do with the trade or the Union. Even the Government must bend (so they think) to their autocratic will. If they will not, then Royalty, the Government, and the public shall know what it means to offend this tyrannical body, though the matter upon which they seek to make them bend to their will is small and trifling. A man named Rew (of whom the world outside the daily course of his activities had never heard before) has now been for days the centre of an interesting dispute. He is in the employ of the Office of Works. Through causes he could not control, he lapsed in his payments to the Union. He is, the Office of Works say, a conscientious and competent workman. The Union determined that he should, through his lapse, be cast out of employment, and be made a pariah so far as his craft was concerned. They issued their decree that the Office of Works should "sack" him. The Office of Works were unaware of any law which insists upon their complying with the commands of the Union. In their view, the matter was entirely a domestic one for the Union. Therefore the man continued in his job; the Union (in association with other organizations) withdrew all the men engaged on the work of light, heat, and power supplies at Palaces, Houses of Parliament, and all Government Buildings, including the Law Courts. Pickets were placed outside these places; and very silly they looked, with hands in pockets, idle and impotent—all through such a trivial matter. The Office of Works refused to do what they knew would be a gross injustice. Rew declined to resign his employment, but was willing to pay his arrears to the Union. The Union, however, declined to have him. All they wished to do was to punish this individual, as well as the national machinery, for not aiding and abetting them in their designs. Trade Unionism, when it falls into such petty ways as this, shows not strength, but a farcical weakness. It makes other people laugh, especially when the work which it was thought could be brought to a standstill can be carried on by other people. As we write, the same Union are threatening to inconvenience the public by bringing about a strike on the Metropolitan Railway in connection with a question of wages in which about thirty men are involved. [A settlement regarding the trouble over Rew was arrived at on Monday evening on conditions which were open to the Union a week before.]

Inside the Oven.

It looks as though the electrical industry may begin to take an interest in the operations that go on inside an electric oven. There seems to be a little uncertainty as to whether the stagnant conditions that exist there while cooking is proceeding is altogether sanitary, or chemically correct. The "Electrician" thinks that electric cooker design and construction should be the subject of serious and properly ordered investigation. There appear to be many "factors" awaiting research. We had a nasty shock when we read the belated but candid confession that one of the "most important" of those factors to take into account is the air circulation within the oven. The electrical papers have held that it is the almost entire absence of ventilation in an electric oven which, despite the cost of heat units supplied by electricity, makes the cooking process (according to the ideas of such opulent folks) so extraordinarily economical. The air flow in a gas oven is regarded as being responsible for a great waste of heat; and, of course, if there is circulation of air in an electric oven the waste of the dearly purchased heat units will be considerable. Then there is the effect of the cooking process on the elements. That is described as another important matter. At one time our electrical friends were not great on chemical matters. Now they are trying to outpace us. The writer in our contemporary says: "Food in the process of being cooked gives off vapour which contains more or less carbon monoxide depending on the amount of air present. Such carbon monoxide [why "such" carbon monoxide?] has a deleterious effect on the life of the elements, and means of getting rid of it as far as possible must be considered." Carbon monoxide generated in electric cookers! Carbon monoxide the poisonous! Carbon monoxide the speciality (so our electrical friends used to think) of the gas industry! Carbon monoxide which belches forth from the exhaust of every motor-car! But carbon monoxide in the electric oven where food is being cooked!!! It is really too awful to think of. But our friend does not consider the food; he has only time and capacity for thinking of the electric heating elements. They must be protected from the attacks of the carbon monoxide. Wicked carbon monoxide to attack electric elements! The mode of protection will be interesting. Is it to be by air circulation? If so, then those wretched and susceptible elements will be exposed to the oxygen in the air which, in the presence of moisture in the oven, may work havoc. Then "the structure of the wire used in the elements, as observed under the microscope, must also be taken into account, so that the winding may be carried out in a way that shall avoid distortion." That looks like more expenditure of labour and time on the wire and the construction of the elements. Accepting all our contemporary says with the characteristic open-mindedness with which we view these things electrical, we thoroughly agree with it that there is room for scientific research within the electrical oven.

Water Power Disadvantages.

From the same source of electrical information, we learn that water power for electricity generation is not an unmixed blessing. In California a shortage of electrical energy was caused by a drought; and the provision of steam stand-by plant to prevent a recurrence of this has proved a somewhat costly proceeding, and has taken some of the gilt off the gingerbread. A similar condition of things, also through drought, has arisen in Switzerland. At Friborg large consumers of electricity have been compelled to do the best they can with a restricted supply. The situation, our contemporary says, is not improving. Therefore, the authorities have prohibited the use of electricity for cooking and heating; motors have to cease their activities at 4.30 p.m.; public lighting has been diminished; shop window lighting is not allowed; and the domestic lighting service has had to be shortened. There is wisdom in the concluding passages of our contemporary's reference to the matter. It says: "Recent statistics show that Switzerland is already using a large proportion of its available water power in the form of electricity. The increase in its use, combined with such occurrences as those described, will impose on those concerned the necessity of providing stand-by steam plant, and of ceasing from dependence on one source of power. This will not help to bring down costs."

Small Dwelling Installations.

The Sheffield Electricity Committee some time ago decided to confer a great boon on the residents in working-class houses, by a system of so-called free wiring and a definite charge for lighting service. The scheme did not induce people in such houses to take leave of their senses in sufficient number to make a really healthy business of it; and the experience of the Electricity Department was that there was not financial advantage in it for the undertaking itself. Then the Chief Engineer (Mr. S. E. Fedden) was instructed to prepare a slot-meter project, and this he has done; and the scheme has been adopted. Under it the Corporation provide and fix the necessary wiring and fittings, consisting of five 40-KW. gasfilled lamps, and the prepayment meters. Adjustments will have to be made on the basis of a sinking fund to recover the cost of the installation after the consumption of 800 KW.H.—ten years' average of 80 KW.H. per annum. What is to be the charge per unit? After the 800 KW.H. have been registered, the meters are to be adjusted to the ordinary rates in force. The scheme can be applied to any group of houses where mains are already available; but the lights installed are to be restricted to rooms in constant use. It is a peculiar thing that the electrical folk always appear to try in their schemes to confuse the patron or would-be patron, and they are pastmasters in applying restriction. They are, in fact, peculiarly keen on restraining the liberty of the customer.

Dangerous Shop Heating.

One of the advantages claimed for electric fires is that, as there are no products of combustion, they can be placed anywhere in a room, with a long trailing cord attached over which people can trip, perhaps disastrously. But there is another danger, as was seen in a recent issue, when an elderly lady met her death through her clothes coming in contact with an electric fire. The danger of putting electric fires about just anywhere is now being acknowledged by men of the electrical industry. Not until there had been experience and trouble did this aspect of the matter occur to them. At a recent "E.D.A." Salesmanship Conference, Mr. G. Nobbs drew attention to the danger of fire which might arise from the use of the electric radiant types in shops. Of course, in some shops, not only the clothes of purchasers and attendants might come in contact with the fires, but the goods exposed for sale might (particularly in drapery establishments) be blown or brushed into contact with the incandescent elements. Mr. Nobbs prefers electric hot-water radiators for shop heating. We agree with him up to a point; and where we disagree is that the heating agent for the water should be gas or coke and not electricity, having consideration not only for comfort, but for economy and efficiency. We think Mr. Nobbs will agree that economy and efficiency should not be overlooked.

The Next, Please.

A quotation *in extenso* from "Meteor" of the "Electrical Times": "We see that Dr. Harry F. Hoffman has been suggesting the use of an incandescent lamp as a remedy for over-indulgence at table. When discomfort follows upon over-much gorging, a glow lamp should be placed over the abdomen. This has a germicidal effect, and will relieve pain. Our own preference is for an electric flat-iron, loading 1000 watts. Used with suitable dexterity at the corners, this has also a germicidal effect. It is apt to be abdominicidal if applied with excessive impetus, but not being luminous it would attract far less attention at a dinner table, and among well-bred people we feel sure that it would be preferred."

EVENING STAR LODGE, NO. 1719.

A very enjoyable evening was spent by the members and guests of the Evening Star Lodge on Monday, Jan. 26, when the annual festival, dedicated to the ladies, was duly observed.

The *mis en scene* of the occasion was the Edward VII. Rooms of the Hotel Victoria, Northumberland Avenue, London. Here upwards of 200 ladies and gentlemen were welcomed by the Worshipful Master, Mr. Rae Prinseps Normand, and his sister, Miss Normand. Punctually at seven, dinner was announced, served at small tables arranged at the sides of the hall, the centre being left for dancing, with which vocal and instrumental items of music were interspersed; Mr. Hermann Sheppard, S.W. of the Lodge, acting efficiently as M.C. The menu and musical programme was embellished by a most successful reproduction of "Songs of the Morning," bearing the autograph of the eminent artist, Henrietta Rae (Mrs. Ernest Normand, mother of the W.M.). At a suitable moment, elegant souvenirs of the evening were presented to the ladies by the Stewards; a diminutive fairy dispatching them on their service by some well-spoken lines.

The toast of "The King" was loyally honoured; and the speech of the Chairman (Mr. Normand), in proposing the good health of "The Ladies," was excellently delivered and received with enthusiasm. It was responded to by Miss Normand, who eagerly seized the opportunity for some delicately aimed repartee. Mr. Arthur Valon, a Past Master of the Lodge, gave the only remaining toast—that of "The Worshipful Master"—in eloquent terms; and in his reply Mr. Normand expressed the pleasure which the Entertainment Committee and himself had derived from organizing the evening. He specially referred to the services rendered by Mr. Sheppard, who had been indefatigable in many ways.

The company included Mr. Frank West (I.P.M.) and Mrs. West; Mr. William A. Surridge (P.M.) and Mrs. Surridge; Mr. E. G. Smithard (Treasurer) and Mrs. Smithard; Mr. Walter Dunn (Secretary) and Mrs. Dunn; Mr. H. L. Sheppard (S.W.) and Mrs. Sheppard; Mr. A. H. Henry (J.W.) and Mrs. Henry; Mr. Fred G. Cockey (S.D.) and Mrs. Cockey; Mr. A. L. Croager (J.D.) and Mrs. Croager; Mr. E. G. Bartholomew (I.G.) and Mrs. Bartholomew; Mr. R. W. Foster and Mr. Foreman (Stewards); Mr. H. W. Packham (P.M.) and Mrs. Packham; Mr. Jacques Abady (P.M.) and Mrs. Abady; Mr. Fred Wicks (Chaplain) and Mrs. Wicks; Mr. Charles Clare (P.M.) and Mrs. Clare; Mr. Alfred C. Beal (P.M.) and Mrs. Beal; Mr. Arthur Valon (P.M.) and Mrs. Valon; Mr. and Mrs. William Belton; Mr. R. J. Milbourne (W.M. of the Murdoch Lodge); Mr. Ernest West (W.M. of the Northern Star Lodge); Mr. T. B. Layton, D.S.O., M.C., and Mrs. Layton; Captain J. P. M. Valon; Mr. Daniel Irving and Miss Irving; Mr. and Mrs. George Evetts; and Mr. and Mrs. Geoffrey M. Gill.

GAS LIGHT AND COKE COMPANY.

The Accounts for the Past Year.

There will be found on p. 221 of last week's "JOURNAL" the report of the Directors of the Gas Light and Coke Company for the year ended Dec. 31, which is to be presented at the meeting of proprietors next Friday. The following are the main features of the accounts for the twelve months, which will also be submitted.

The statement of capital (stock) sets forth that the total paid-up is £10,588,420; added on conversion, £12,941,060—total amount authorized, £23,529,480. Deducting the amount redeemed, £407,175, the total amount of the Company's existing capital powers is £23,122,305. The statement of loan capital stands thus: Total paid-up, £3,294,160; added on conversion, £1,639,770; remaining unissued, £750,000—total amount authorized, £5,683,930.

CAPITAL ACCOUNT.

The capital account shows receipts (with premiums, £1,707,183) to the amount of £29,806,393. The expenditure is shown in the following items:

	Expended this Year.	Total to Dec. 31, 1924.
Expenditure to Dec. 31, 1923		£15,391,7[illegible] 5 8
Expenditure during the year to Dec. 31, 1924—		
Land acquired, including law charges	£121,591 10 7	
Buildings and machinery in extension of works	99,960 2 2	
New and additional mains and service-pipes	144,669 4 10	
Do. do. meters	72,493 6 10	
Do. do. stoves	176,930 2 7	
		615,644 7 0
		£16,007,427 12 8
By sale of surplus land	£4,783 4 0	
„ amount written off plant	11,111 16 3	
„ depreciation of stoves	54,087 0 0	
		69,982 0 3
Total expenditure		£15,937,445 12 5
Nominal amount added on conversion		14,580,830 0 0
		£30,518,275 12 5
Deduct amount of capital redeemed under the Gas Light and Coke Company's Act, 1903—		
Per previous account	£364,200 0 0	
This year	42,975 0 0	
		407,175 0 0
		£30,111,100 12 5

REVENUE ACCOUNT.

Expenditure.

Year, 1923.		£ s. d.	£ s. d.
	Manufacture of gas—		
£2,974,527	Coal, including all expenses thereon	3,228,209 1 11	
154,381	Oil „ „ less value of oil tar	168,619 8 6	
293,123	Coke, &c., used in the manufacture of carburetted, &c., water gas	310,271 9 11	
76,040	Salaries of engineers and other officers at works	80,793 8 9	
337,353	Wages	346,536 16 5	
45,293	Purification	43,209 14 3	
1,581,066	Repair and maintenance of works and plant, materials and labour, less received for old materials, £21,126 16s. 3d.	1,323,104 11 6	5,500,744 11 3
	Distribution of gas—		
336,501	Salaries and wages (including rental clerks) and cost of pumping gas	365,375 1 1	
464,621	Repair and maintenance of mains and service-pipes, &c.	470,208 19 1	
241,661	Repair and renewal of meters	232,239 16 10	
386,263	„ „ stoves	455,581 '4 7	
68,950	Fitting up automatic meter supplies	59,144 18 3	1,582,550 9 10
113,112	Public lamps—lighting and repairing	..	111,418 6 4
	Rents, rates, and taxes—		
18,254	Rents payable	18,919 10 9	
507,525	Rates and taxes	515,752 3 6	534,671 14 3
	Management—		
10,000	Directors' allowance	10,000 0 0	
600	Company's Auditors	600 0 0	
48,493	Salaries of management staff	48,185 5 7	
133,759	Collectors and cashiers	136,746 9 1	
38,161	Stationery and printing	34,802 15 7	
53,987	General charges	48,294 14 7	278,629 4 10
63,666	Co-partnership	..	71,794 9 5
353	Parliamentary charges	..	2,461 18 8
1,482	Law charges	..	1,522 6 5
658	Rating charges	..	556 6 11
10,845	Bad debts	..	8,464 4 5
1,000	Depreciation fund for works on leasehold lands	..	1,000 0 0
122,394	Annuities and contributions to superannuation funds	..	117,586 7 4
8,892	Workmen's compensation	..	7,623 1 3
43,121	Contribution under National Insurance Acts	..	44,965 7 1
	Public officers, &c.—		
5,286	Contributions under Gas Regulation Act, 1920, and Official Auditor	3,739 17 4	
1,403	Public testing-stations	1,128 9 1	4,868 6 5
8,144,772			8,268,856 14 5
1,378,811	Balance carried to net revenue account		1,376,739 0 8
9,523,581			9,645,595 15 1

Total Wages Paid 1924, £2,312,551. Total Salaries Paid 1924, £510,040.

Revenue.

Year, 1923.		£ s. d.	£ s. d.
£6,087,888	Sale of gas— Per meter at 8·6d. per therm	6,096,573 16 6	
193,505	Public lighting and under contracts	183,034 12 2	
6,281,393			6,279,608 8 8
220,757	Rental of meters	..	227,623 0 10
252,863	Rental of stoves	..	288,177 9 2
343,550	Rental of fittings	..	380,916 6 6
	Residual products—		
1,594,374	Coke, less labour, &c.	1,774,325 10 5	
92,186	Breeze, less ,, ,,	141,926 6 3	
508,377	Tar and tar products	390,674 9 2	
209,551	Ammoniacal liquor and sulphate of ammonia	139,461 11 9	
2,404,488			2,446,387 17 7
19,851	Rents receivable		22,263 19 4
679	Transfer fees		618 13 0
9,523,581			9,645,595 15 1

NET REVENUE ACCOUNT.

The total of the net revenue account is £1,604,034. The following statement shows how it is appropriated:

Year 1923.		£ s. d.
£159,008 ..	Interest on debenture stocks and bonds for the year	£159,007 18 0
63,211 ..	Interest on temporary loans and sundry funds, less credits	48,936 15 11
	Dividends, &c., for the half-year to June 30, 1924:	
81,245 ..	Dividend on the 4 p.ct. consolidated preference stock, £81,244 14s.	
45,500 ..	Dividend on the 3½ p.ct. maximum stock, £45,500	
20,000 ..	Contribution to redemption fund, £20,000	
£5 4s. 0d. per cent. ..	Dividend on the ordinary stock (£5 6s. 8d. p.ct. per annum), £440,081 4s.	
429,079		
575,824		586,825 18 0
825,123 ..	Balance applicable to redemption fund and to dividends, December half-year, 1924	809,263 10 1
£1,623,166		£1,604,034 2 0

The four statements relating to the redemption, reserve, special purposes, and depreciation funds stood as follows on Dec. 31: Redemption fund, £60,000; reserve fund, £133,907; special purposes fund, £485,238; depreciation fund, £114,210.

Proposed Appropriation of Balance on Net Revenue Account, Dec. 31, 1924.

Year 1923.		£ s. d.	£ s. d.
£825,123	Balance	..	809,263 10 1
	Amount required for dividends, &c., for the half-year to Dec. 31, 1924:		
£81,245	Dividend on the 4 p.ct. consolidated preference stock	81,244 14 0	
45,500	Dividend on the 3½ p.ct. maximum stock	45,500 0 0	
20,000	Contribution to redemption fund	20,000 0 0	
11,602	,, reserve fund	..	
£5 6s. 8d. p.ct. £440,081	Dividend on the ordinary stock, £5 6s. 8d. p.ct. per annum on £16,460,070	438,935 4 0	
£597,828			585,679 18 0
£227,295	Balance carried to next year's account	..	£223,583 12 1

The remaining statement is the balance-sheet, which gives the value of the stores on hand at the close of the year as follows: Coal, £411,525; gas oil, £103,568; coke, £123,222; tar and ammoniacal liquor and products, £199,907; sundry stores, £777,845. The figures at the end of 1923 were: Coal, £357,057; gas oil, £82,567; coke, £40,314; tar and ammoniacal liquor and products, £203,211; sundry stores, £629,986.

Statement of Coal.

—	In Store Dec. 31, 1923.	Received during Year.	Carbonized during Year.	Used during Year.	In Store Dec. 31, 1924.
	Tons.	Tons.	Tons.	Tons.	Tons.
Coal	239,368	2,238,332	2,192,291*	4424	280,985

* In addition to this quantity of coal, 11,784,916 gallons of oil have been used during the year.

Statement of Residual Products.

Description.	In Store Dec. 31, 1923.	Made during Year.	Used during Year.	Sold during Year.	In Store Dec. 31, 1924.
Coke—tons	35,056	1,389,980	240,175	1,077,711	107,150
Breeze—tons	21,808	237,081	33,154	212,645	13,090
Tar, from coal only—galls.	2,140,549	20,508,578	20,540,438	14,110	2,094,579
Ammoniacal liquor—butts	31,720	597,619	597,655	..	31,684

Statement of Gas Made, Sold, &c.

		Quantity Made.	Quantity Sold. Public Lights and Under Contracts (Estimated).	Quantity Sold. Private Lights (per Meter).	Quantity Sold. Total Quantity Sold.	Quantity Used on Works, &c.	Total Quantity Accounted for.	Quantity Not Accounted for.	Number of Public Lamps.
1924.	Cubic feet (thousands)	39,369,309†	829,491	35,675,426	36,504,917	542,868	37,047,785	2,321,524	40,904
	Therms §	197,591,214	4,162,597	179,052,471	183,215,068 *(182,524,585)	2,724,670	185,939,738	11,651,476	
1923.	Cubic feet (thousands)	36,570,919	858,407	32,553,548	33,411,955	525,722	33,937,677	2,633,242	42,831
	Therms	183,542,483	4,307,912	163,378,386	167,686,298	2,638,546	170,324,844	13,217,639	

* At declared calorific value—viz., 500 B.Th.U. per cubic foot.
† Including 10,659,272 thousands of carburetted, &c., water gas.
§ At actual calorific value—viz., 502 B.Th.U. per cubic foot.

COMMITTEE ON INDUSTRY AND TRADE.

THE Committee on Industry and Trade, appointed by the Prime Minister in July, 1924, are continuing their work under the original terms of reference with the approval of the present Government. The Chairman is Sir Arthur Balfour, K.B.E. The terms of reference to the Committee are to inquire into, and report upon, the conditions and prospects of British industry and commerce with special reference to the export trade, and to make recommendations in regard thereto. It was thought desirable that in the first instance the Committee should devote their main attention to the position of a number of the great producing and manufacturing industries and the trades associated with them—*e.g.*, coal, iron and steel, engineering and shipbuilding, electrical manufacturing, chemicals, cotton, and clothing. As regards evidence, national organizations and individual associations (both of employers and of workpeople), the co-operative movement, chambers of commerce, associations of merchants, various organizations connected with transport, bankers, and economists have all promised to give evidence. The Committee are hoping to obtain data showing the reasons for the increases in costs which have occurred, and to investigate so far as possible the various factors involved—the cost of materials, the wages bill, the cost of fuel or power and transport, the burden of rates and other charges, the efficiency of labour and management, the supply and remuneration of capital, &c. It will be apparent that the Committee cannot hope to complete their task for a considerable time; but there is no reason to be dissatisfied with the progress already made. A highly important branch of material supplied by Government Departments relates to the principal manufacturing and exporting industries of the United Kingdom; and in this connection technical education and research in their relation to production are touched upon. The question of standardization has not been overlooked. Closely connected with the problem of production are various questions relating to labour conditions, and the Committee have been, and are being, supplied with full information on such matters as hours, wages and methods of remuneration, industrial disputes and methods of settlement, welfare, growth of trade unionism, and many other subjects. The Committee desire that representatives of all the interests concerned should be given full opportunities of stating their case and submitting their views; they will make such investigation as is practicable into the major problems involved. They hope, by the mode of procedure that is being followed, to obtain such a general view of the situation as will enable them to arrive at useful recommendations which will command general assent; and so contribute to that full measure of trade and employment which may already be on the way, and is so much to be desired.

The annual meeting of the Iron and Steel Institute will take place on Thursday and Friday, May 7 and 8, at the Institution of Civil Engineers, Great George Street, S.W.; and the autumn meeting in Birmingham, on Wednesday, Thursday, and Friday, Sept. 9, 10, and 11.

SOUTH METROPOLITAN GAS COMPANY.

Annual Report and Accounts.

The following is the report of the Directors of the South Metropolitan Gas Company for the year ended Dec. 31, which will be presented at the general meeting next Wednesday:

The Directors are pleased to record the fact that in the Company's centenary year its progress has continued unabated, the increase in therms sold during the past twelve months amounting to 6·1 p.ct.

The popularity of gas lighting in shopping centres and busy thoroughfares is still increasing, a result to which the research department of the Company has in no small measure contributed.

During the year the price of coal remained at its previous high level; it is now somewhat cheaper, but any prospective saving under this head is more than offset by the heavy fall in the value of residual products, which anticipated the reduction in the cost of the raw material. When, in addition, it has to be recorded that wages are again on the upward grade, the difficulty of maintaining the price of gas at its present figure will be appreciated.

The redeemable preference stock issued in 1917 is now fully paid off in accordance with the terms of the issue.

The Directors recommend payment of a dividend for the year of 5¾ p.ct. on the ordinary stock, less the interim dividend of 2½ p.ct. already paid; the allocation of £16,500 to the reserve fund, which was heavily drawn upon during the war; and the placing of £66,074 to the employees' co-partnership fund. The co-partnership continues to work admirably, alike in the interests of the public, the employer, and the employed.

A Bill has been deposited for obtaining statutory authority to extend the powers already possessed by the Company for association with other undertakings. Though no proposals of the kind are at present under discussion, the increasing and economic requirements of gas supply will, at no distant date, render it imperative to make the fullest use of opportunities for associated working. The Bill will be explained at the extraordinary meeting which follows the ordinary meeting.

The Directors, with great regret, record the death of their colleague, Mr. Kenneth Phipson Hawksley, who for fourteen years was a highly valued member of the Board. Mr. Benjamin Robert Green has been elected to fill the vacancy.

Two Directors, Mr. Arthur Matthews Paddon, M.Inst.C.E., and Mr. Frank Bush, and one Auditor, Mr. George S. Fry, C.B.E., retire by rotation, and, being eligible, offer themselves for re-election.

CHARLES CARPENTER,
President.

Offices: 709, *Old Kent Road, S.E.* 15.
Jan. 28, 1925.

The Accounts.

The following are the principal portions of the accounts accompanying the report.

The first two statements relate to the stock and loan capital. The former states that the ordinary capital issued prior to 1916 under the Company's various Acts, on which dividend is payable, is £6,609,895. The loan capital account shows that the loan capital, the rate of interest on which is 3 p.ct., amounts to £1,895,445; and the redeemable 6½ p.ct. loan capital to £734,000.

The third statement is the capital account, which stands at £9,217,320. The items of expenditure are as follows:

Capital account to Dec. 31, 1923		£8,752,573 15 4
Expenditure during year to Dec. 31, 1924—viz.:		
Buildings, plant, and machinery	£45,666 13 6	
Mains and services	18,066 19 6	
Meters	13,366 6 6	
Stoves and fires	21,621 19 4	
		98,721 18 10
Total expenditure		£8,851,295 14 2
Balance		366,024 5 10
Total		£9,217,320 0 0

The net revenue account shows a balance of £312,695 applicable to dividends. The balances of the reserve, renewal, and special purposes funds stood as follows on Dec. 31 last: Reserve fund, £180,102; renewal fund, £57,352; special purposes fund, £194,315.

The remaining statement is the balance-sheet, which gives the value of the stores in hand at the close of the year as follows: Coal, £338,470; coke and breeze, £57,707; tar, ammonia, and products, £200,088; and sundry plant and stores, £296,967. The figures this time last year were: Coal, £303,372; coke and breeze, £11,576; tar, ammonia, and products, £230,063; and sundry plant and stores, £230,442. A sum of £164,665 co-partnership bonus and savings, has been deposited with the Company; and the total of the superannuation and guarantee funds is £404,194.

Statement of Coal.

In Store Dec. 31, 1923.	Received during the Year.	Carbonized during the Year.	Used during the Year.	In Store Dec. 31, 1924.
Tons. 207,546	Tons. 1,321,362	Tons. 1,287,739	Tons. 1833	Tons. 239,336

REVENUE ACCOUNT.

Expenditure.

To Manufacture of gas—		
Coal into store, including £10,074 8s. 6d. for London Port and tonnage dues	£1,853,078 15 6	
Purification	61,835 8 11	
Salaries of staff	76,972 18 11	
Wages (carbonizing)	203,911 5 2	
Repair and maintenance of works and plant, less £12,171 16s. 11d. received for old materials	573,258 13 10	
		£2,769,057 2 4
Co-partnership fund		66,074 4 3
Distribution of gas—		
Repair, maintenance, and renewal of mains and service-pipes	£236,569 14 3	
Salaries of staff	100,607 11 6	
Repair and renewal of meters	115,061 19 0	
Repair and renewal of stoves and fires	220,900 17 11	
Repair and renewal of fittings	169,032 15 7	
		842,172 18 3
Public lamps, labour and materials £61,896 18s. 10d., less £51,863 9s. 8d. received for the same		10,033 9 2
Rents, rates, and taxes—		
Rents payable	£6,520 18 10	
Rates and taxes	126,305 4 10	
		132,826 3 8
Management—		
Directors' allowance	£5,918 6 11	
Salaries of staff	33,554 14 6	
Collectors { Ordinary	18,861 7 4	
Collectors { Slot meter	58,140 1 9	
Stationery and printing	23,642 18 5	
General charges	50,683 13 11	
Company's Auditors	500 0 0	
		191,301 2 10
Miscellaneous—		
Law charges	1,364 8 11	
Parliamentary charges	1,288 11 5	
Bad debts	3,218 12 6	
Superannuation, sick, and accident funds	63,939 3 6	
National Health Insurance	9,619 5 3	
Unemployment Insurance	17,332 18 0	
Gas Referees and Official Auditor	1,616 19 0	
Leasehold renewal fund	2,000 0 0	
		100,379 18 7
Total expenditure		4,111,844 19 1
Balance carried to net revenue account		362,731 2 4
		£4,474,576 1 5

Receipts.

Sale of gas—		
At 8d. per therm	£2,762,569 18 3	
Public lighting	55,571 14 9	
		£2,818,141 13 0
Rents—		
Meters	£121,971 18 0	
Stoves and fires	116,084 12 0	
Fittings	168,679 12 4	
		406,736 2 4
Bye-products—		
Coke	£954,615 14 8	
Breeze	16,512 19 11	
Tar and products	168,384 3 0	
Ammonia and products	105,472 19 1	
		1,244,985 16 8
Rents receivable		4,482 6 11
Transfer fees		230 2 6
Total receipts		£4,474,576 1 5

Statement of Bye-Products.

——	In Store Dec. 31, 1923.	Made during the Year.	Used in the Year.	Sold in the Year.	In Store Dec. 31, 1924.
Coke—tons	10,355	789,504	156,766	591,816	51,277
Breeze—tons	2,541	132,887	53,767	79,199	2,462
Tar—gallons	513,317	12,036,731	12,047,225	8,018	494,805
Ammoniacal liquor—butts	12,311	486,716	485,734	..	13,293

Statement of Gas Made, Sold, &c.

Total Made.	Sold.		Total Accounted for.	Number of Public Lamps.
	Public Lights (estimated).	Private Lights (per Meter).		
Therms. 93,235,872*	Therms. 1,987,386	Therms. 87,215,764	Therms. 90,604,244	26,044

* Includes 176,259 therms purchased from H.M. Fuel Research Station.

Analysis of Gases by Light.

It may be mentioned that in the latest general list of Messrs. Adam Hilger, Ltd., of 75a, Camden Road, London, N.W. 1, the Rayleigh interference refractometer is described. This instrument is for work on the refractometry of gases, of which the refractive indices differ so little from unity that a very high degree of sensitivity is required. Some idea of the sensitivity of the instrument will be gained when it is stated that it is possible to detect the presence of 0·01 p.ct. of hydrogen in air. The principle is that of the interference bands formed by two adjacent slits in collinated light, and observed by means of a telescope. The arrangement is, in fact, a diffraction grating with only two openings; and the means whereby the system of bands thus obtained is made to indicate the refractive index of a substance is provided by the sideway shift of the whole band system when any change is made in the optical path of one of the interfering beams. The quantities of gases in air detectable by the Rayleigh refractometer are as follows: Hydrogen, 0·01 p.ct.; nitrogen, 0·3 p.ct.; nitric oxide, 0·0065 p.ct.; argon, 0·15 p.ct.; helium, 0·006 p.ct.; sulphur dioxide, 0·034 p.ct.; water, 0·04 p.ct.; hydrogen sulphide, 0·0045 p.ct.; chlorine, 0·003 p.ct.; carbon monoxide, 0·03 p.ct.; carbon dioxide, 0·0095 p.ct.; and ammonia, 0·017 p.ct.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

On Friday, Jan. 30, a meeting of the Association was held at the Westminster Technical Institute. At this Mr. D. CLEAVE CROSS, Assoc.M.Inst.C.E., read a paper on the spiral-guided gasholder which has recently been erected at the Lea Bridge Gas-Works. During the erection of this holder Mr. Cross took a large number of very interesting photographs; and out of 300 of these, 55 lantern slides were made, which served to illustrate his paper, and considerably added to its interest.

Mr. W. NEWTON BOOTH, who presided, said that Mr. Cross needed no introduction; and they all looked forward with interest to his paper.

Mr. CROSS then read the following paper on

NEW GASHOLDER AND STEEL TANK AT LEA BRIDGE GAS-WORKS.

The new gasholder is spiral guided, and consists of four lifts with a total capacity of 2½ million c.ft., working in a steel tank 173 ft. in diameter by 30 ft. 6 in. deep. It was erected by Messrs. Samuel Cutler & Sons, Ltd. From experience gained in the erection of a previous holder, it was known that a considerable quantity of water was encountered below a depth of 8 ft., owing to the close proximity to the River Lea; and though the upper sub-soil consisted of a good bed of gravel, difficulties were experienced at lower depths with pockets of clay and running sand. In the present case it was therefore decided to build the holder in a steel tank with the bottom only 6 ft. below the ground level, or about 10 ft. below the general yard level. It was found that a steel tank under these conditions would be cheaper than one of reinforced concrete.

FOUNDATIONS.

The excavation was commenced in September, 1922. The whole of the excavation and concrete work was carried out on a schedule basis, the quantities being agreed upon with the contractor before the work was commenced. The Gas Company supplied all the cement, ballast, and hardcore required for the concrete, and also undertook to carry out all the necessary pumping of water. We were fortunate in this respect, for during the period of carrying out the foundations it was exceptionally dry. The size of the excavation was 193 ft. in diameter, which allowed a space of 10 ft. round the outside of the tank. The top soil and clay was removed by means of bogies running on portable light railway lines; the top soil being used to level-up surrounding land, while the hoggin, sand, and ballast were stacked for future use and sale. The sand and gravel were removed all over down to a level of about 6 ft. below the surface, which was to be the finished level of the top of the concrete foundations, leaving sufficient gravel and sand to carry out subsequent concrete work. A sump 4 ft. square was sunk about 14 ft. deep near the edge of the excavation, but in a corner of the land. Over this sump was erected a 4-in. centrifugal pump driven by a small 6-H.P. electric motor. The current for this was obtained from our own works plant.

The concrete foundations under the tank were made 4 ft. larger in diameter than the tank itself. The average depth of concrete in a ring 9 ft. wide round the outer edge of the tank was 3 ft., as was also a portion 10 ft. square under the centre of the tank. The remainder of the concrete foundation was 1 ft. 9 in. deep.

We started by preparing for concrete a small portion of ground 9 ft. wide opposite the sump on the outer circumference. This 9 ft. strip, which was covered with concrete 3 ft. deep, was worked for a little more than half the way round the tank, and then the segment formed was worked in towards the centre. All the ballast required for making the concrete was obtained from the excavation around the concrete mixer, while the surplus was removed. The concrete was formed of one part of cement, two parts of sand, and six parts of screened gravel and hardcore, and was mixed by a small petrol concrete-mixer. As the excavation and concreting of the outer ring proceeded, 6-in. earthenware drain pipes were laid with open joints, and were connected to the sump; pockets being left on the way round for the purpose of clearing the drain if it should silt up during operations. By this means the excavations were kept free from water. The foundations for the inlet and outlet pipes were built at an angle of 60° to each other, provision being made in the concrete foundations for the 24-in. inlet and outlet pipes to be fixed after the tank was completed, by building two recesses, each 4 ft. 6 in. wide by 4 ft. deep by 14 ft. 9 in long, under the tank. Over each were placed seven 8 in. by 5 in. steel joists to support the tank. At the back end of the recess the ducksfoot bends were bolted direct to the bottom of the tank, and to the steel riser pipes inside. At the front end of the recess the pipes were connected to deep syphon pots, to which were fitted cast-iron T-pieces, and two 24-in. rack and pinion valves.

The total time taken to complete the foundations for the tank was about four months; the work on erection of the tank commencing the second week of January, 1923. The total cost of the excavation, foundations, and pumping, excluding ballast obtained from the site, amounted to £3550.

ERECTION OF TANK.

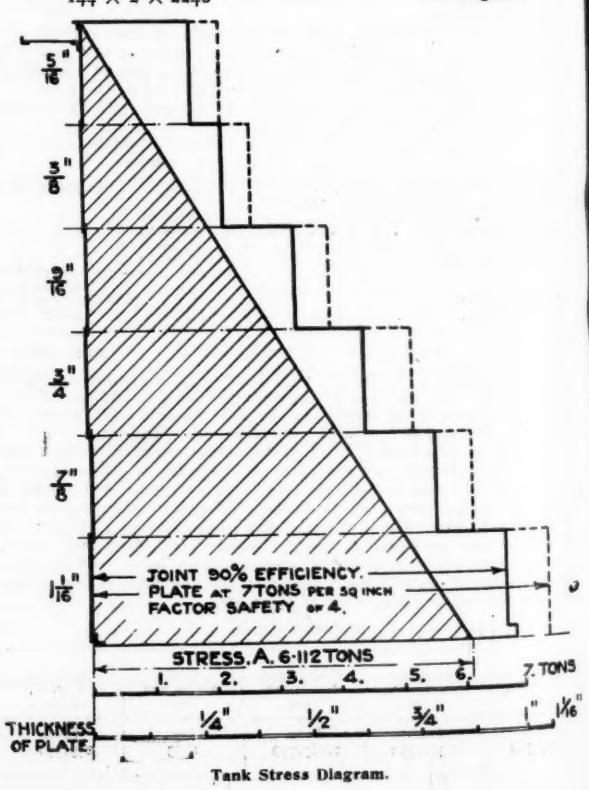
While the foundations were being completed, Messrs. Samuel Cutler erected their workshops and the pneumatic plant required for riveting and caulking. The latter consisted of a 42 B.H.P. oil engine driving a compressor which delivered air up to 100 lbs. per sq. in. pressure to receivers, from which a main distributing pipe was run round the outside of the foundations, with connections for distributing hoses. Early in January, 1923, the erection of the tank was commenced. The centre plate of the bottom of the tank was the first one to be fixed, and care had to be exercised to get this in exactly the correct position relative to the inlet and outlet connections. The whole bottom of the tank and first row of side plates were erected upon timber stools, or horse boxes, of about 3 ft. in height, to allow access to the underside of the tank for riveting and inspection. The outer ring of the bottom plates was ⅜ in. thick, and the remainder 5/16 in. thick. All the riveting of the bottom plates was done by small hand pneumatic riveters, while for the outer ring, the 6 in. by 6 in. by 1 in. bottom angle curb, and the heavy side plates, large riveting machines were used having a 6 ft. gap, and an arrangement of pistons and toggles by means of which a steady closing pressure of up to 80 tons could be brought to bear upon each rivet. These pneumatic riveters weigh over two tons each, and were carried by portable cranes or travelling derricks. There is no doubt the machines are very efficient, and make a sound job.

After completion of the riveting and caulking of the bottom and the first row of side plates, the tank was filled with water to a depth of 10 in., for testing. All the seams and rivets were carefully examined, and leaks stopped. It will be seen that, by having the tank upon horse boxes, it was possible to inspect the whole of the underneath. The underside was then given a thick coating of tar and pitch. The water was run out, and the tank lowered by a series of jacks on to a bedding of 2 in. of sand laid over the whole of the concrete foundations.

The remainder of the side plates were then erected and riveted in successive tiers by the riveting machines. Three derricks, each about 40 ft. high, travelling on a single rail inside the tank, were used for erecting all the side plates, for carrying the large pneumatic riveters, and also for suspending the cradles and platforms from which the men worked. The side plates of the tank are in six tiers each 5 ft. in depth, placed one row in and one row out alternately; the bottom tier being 1 1/16 in. thick, the second tier ⅞ in., the third tier ¾ in., the fourth 9/16 in., the fifth ⅝ in., and the top tier 5/16 in. thick. The side plates of the bottom tier are 19 ft. 5 in. long, and each weighs 2 tons. The length of the plates in other tiers is 26 ft., and each of the plates in the second tier weighs 2 tons 2 cwt. All the vertical joints of the six tiers have double butt covers. Each joint is designed to have a 90 p.ct. efficiency. In the bottom row there are 130 1⅛-in. rivets in each joint, while in the second row there are 146 1-in. rivets in each joint.

In the following tank stress diagram, it will be seen that the stress at the bottom of the tank due to the water is 6·11 tons per sq. in., and that a minimum factor of safety of 4 has been allowed for the joint. Ultimate tensile value of steel 28 to 32 tons per sq. in.

$$\frac{30{\cdot}5 \times 62{\cdot}28 \times 173 \times 12}{144 \times 2 \times 2240} = 6{\cdot}112 \text{ tons} = \text{Stress A on diagram.}$$



Tank Stress Diagram.

To provide additional support for the tank carriages, and to help to distribute the load imposed by them, there are 28 double channel stanchions fixed inside the tank, comprising two 6 in. by 3½ in. by 3½ in. channel bars suitably stiffened. These are carried down from the underside of the tank carriage to the bottom of the tank, and secured to each tier of plates. On the bottom there 28 6 in. by 5 in. steel rest blocks. Round the top of the tank there is a 2 ft. wide balcony with hand-rail, fixed to a secondary angle-iron curb 9 in. below the level of the top curb.

To facilitate the handling of the gasholder material, and to save lifting the whole of it over the top of the tank, a plate was left out of the third tier of the side, and the whole of the gasholder material was passed through this hole. Directly the erection of the tank sides was completed, the building of the gasholder was commenced. The outer or bottom lift was the first to be erected; and as soon as the plates were fitted, and while the riveting was in progress, the erection of the next lift was started. The following are a few of the dimensions and details of the gasholder itself.

Working capacity							2½ million c.ft.	
Outer lift, 170 ft. 0 in. diameter by 30 ft. deep.							28	spirals
Third	,,	167	,,	1½	,,	,, 30 ,, ,,	21	,,
Second	,,	164	,,	3	,,	,, 30 ,, ,,	18	,,
Inner	,,	161	,,	4½	,,	,, 30 ,, ,,	15	,,

Cups and Grips.—11 in. wide by 24 in. deep, formed of 11 in. by 3½ in. steel channels and $\frac{5}{16}$ in. skirting plates.

Side Sheets.—The top and bottom rows of each lift are $\frac{5}{16}$ in. thick. The next adjoining rows are $\frac{3}{16}$ in. thick, while the rest of the intermediate sheeting is 10 S.W.G. thick. The spiral plates are 12 in. wide by $\frac{5}{16}$ in. thick, with rails of 41 lbs. per yard securely riveted.

Top Curb.—This consists of two angles. The upper one, 6 in. by 6 in. by ¾ in. angle, is opened to suit the rise of the crown, and forms the junction of the side and top sheets. The lower angle, 6 in. by 4 in. by ¾ in. section, is riveted to the top row of side sheets immediately below the upper curb.

Bottom Curb.—This consists of an 8 in. by 6 in. by 6 in. steel joist.

Carriages and Rollers.—These are on the "Bearscot" type supplied by Messrs. R. & J. Dempster. Each carriage has four rollers and is made of steel throughout.

Vertical Stays.—There are 28 vertical stays on each lift, secured to the curbs by brackets. At the bottom they are bent under the cup to the full width of the cup.

Crown.—The rise of the dome is 8 ft. The crown sheets range from ⅜ in. thick down to 10 S.W.G. The crown framing consists of 15 main rafters formed of 10 in. by 5 in. joists curved to the radius of the crown, and trussed, with 15 secondary rafters formed of 10 in. by 5 in. joists, and trussed, and also 30 tertiary rafters formed of 4 in. by 4 in. by ½ in. T bars, and trussed. There are 15 main tension rods, 2½ in. in diameter, attached to the main rafters and secured to the bottom of the centre post or pipe, which is 2 ft. in diameter by 22 ft. 6 in. long. The plate left out of the side of the tank was not fitted until the erection of the trussed crown framing was completed and the derricks removed. This saved a great deal of extra handling.

The tank was filled with water from two 2-in. supplies. One was from the Metropolitan Water Board, from whom we obtained 2½ million gallons of water, at a cost of £120. The other was from our own sump pump, from which was obtained approximately 2 million gallons, making 4½ million gallons in all to fill the tank. This was accomplished in thirty days.

An air box was temporarily fitted on the outlet pipe of the holder, so that men could obtain access to the inside of the holder while it was under pressure and inflated with air. Inside the air box was an old retort mouthpiece lid, through which the men lowered themselves. They crawled along the outlet pipe to the ducksfoot bend, and then climbed a ladder in the inside riser pipe, and got on to the rafts floating on the water. They were thus able to float anywhere round the inside of the holder, and stop any leaks by knocking-down rivets, or caulking. The holder was inflated with air twice to its full height, and let down for testing and painting. While being inflated or lowered, each time a row of rivets came to the water line, the raising or lowering of the holder was stopped, and the seam examined. Any leaks were thus clearly observed, and were at once attended to. During the second time the holder was inflated with air, and also when first charged with gas, the sides were painted. After it had been inflated twice with air, and was ready to be filled with gas, the ladder and rafts were taken out, and the manholes made good. The air box was removed, and the gas connection made to the inlet and outlet valves. For blowing the air out of the crown of the holder, a 5-in. pipe was lowered through a hole in a crown plate at a point farthest away from the gas inlet pipe, to within 3 in. of the water, the incoming gas rising to the top of the crown, displacing the air from the water level. On this pipe was placed a valve and a vent pipe. The air, and afterwards air and gas mixture, were allowed to blow out of the vent pipe until a fairly low oxygen test was obtained by the Orsat. The holder was not allowed to rise until this vent pipe was removed, and the plate sealed. A recording pressure gauge was fitted to the outlet pipe when the holder was first raised and lowered, to indicate any binding of the spiral guide rollers. I may add that there was none. The holder was brought into regular commission on Oct. 31, 1923.

Discussion.

Mr. NEWTON BOOTH wondered why the inside surfaces of gasholders were seldom painted. In 1915 he had the opportunity of inspecting the inside of a holder which was erected in 1883; and he discovered that the sheets were considerably corroded.

Mr. CROSS said that, on a holder at Lea Bridge which had been condemned, all the corrosion was external. Of course, until the war, the oil used for carburetting amounted to as much as 3 gallons per 1000 c.ft., and this might have acted as a preservative. Nearly all the corrosion on the inside of gas apparatus could be traced to the presence of oxygen in the gas.

Mr. W. GROGONO (Gas Light and Coke Company) asked why the inlet and outlet pipes of the Lea Bridge holder had been placed at an angle of 60°.

Mr. CROSS replied that no engineer would now build a holder having the inlet and outlet pipes side by side. Usually they were at 90°; but at Lea Bridge 60° had been deemed sufficient. The reason for placing them so wide apart was to avoid as far as possible the likelihood of stratification when working into and drawing out of the holder at the same time. He remembered some tests which had been carried out on a relief holder, with inlet and outlet side by side, used for storing water gas. Even in the laboratory, when the gas had passed the meter, half-minute calorific value determinations showed a variation from 490 to 168 B.Th.U. per c.ft.—following almost exactly the water gas cycle. Moreover, the holder was half full at the time.

Mr. NEWTON BOOTH said that papers giving details of the construction of gasholders would always prove of interest; for no two holders presented the same problem. The subject of Mr. Cross's paper had been dealt with in a most complete manner, and the paper would form a valuable addition to the transactions of the Association.

A vote of thanks to Mr. Cross, proposed by Mr. GROGONO, and seconded by Mr. J. H. Goldsmith (South Suburban Gas Company), concluded the meeting.

Koppers' Magazine.

To a new house organ has to be extended a cordial welcome. This is the "Koppers' Magazine"—the journal of the Koppers Coke Oven Company, Ltd., of No. 301, Glossop Road, Sheffield. It will cover a more extensive field than is the case with some house publications; for we learn from the first issue that its purpose is to bring to the notice of those interested in the coke oven industry the modifications and improvements which are introduced from time to time in the Koppers system of carbonization. It is also intended to publish items of general interest pertaining to the development of the industry as a whole. The Koppers Coke Oven Company was, it is stated, formed as an entirely British undertaking to acquire from the Public Trustee the business, patents, and goodwill of the old Koppers Coke Oven and By-Product Company. For the purpose of producing an easily combustible coke for blast furnaces—*i.e.*, a coke which has not been subjected during carbonization to a temperature exceeding 850° C., the Koppers taper oven has been introduced; while foundry coke can easily be produced by extending the period of carbonization until the charge attains a temperature of 950° to 1000° C. The taper principle of construction is applied to the various types of ovens of the Koppers design—namely, the regenerative coke oven, the chamber gas oven, the combination coke and gas oven, and the waste heat oven—a full illustrated description of each of which is to be found in this first number of the "Koppers' Magazine."

Institution of Chemical Engineers.—At a joint meeting of the Chemical Engineering Group and the Institution of Chemical Engineers, to take place next Wednesday (Feb. 11), at the Institution of Mechanical Engineers, Storey's Gate, S.W., the following papers will be presented: "Internal Combustion Boilers," by Mr. Oscar Brunler; and "Steam Generation under Critical Conditions," by Mr. David Brownlie, B.Sc.

"The Law Relating to Public Service Undertakings."—We have received from Messrs. P. S. King & Son a copy of this new publication, written by F. N. Keen, LL.B. Based on lectures delivered at the London School of Economics, this book comprises a survey of the legal position of public service undertakings generally, and a more detailed consideration of particular classes of undertaking. It is published at 15s. net.

Gas Workers' Wages.—At the end of the first paragraph of the article on this subject last week (p. 195), the passage appeared: "It was also further provided that, when the average cost-of-living figure reached 80, the employers' side would be justified in making an application, upon giving one month's notice in writing, to discuss a further increase in wages." It will have been obvious from the context that the word "employers" should have been "employees."

Gas Engine Breakdowns.—The point has been emphasized, in an article in "Vulcan," that too much importance cannot be attached to the careful treatment of connecting-rod bolts, both in tightening, to ensure that the working stresses are equally shared, and also in periodically changing or annealing them. Where bolts are fitted at the gudgeon end, it is necessary that they should receive as much care and attention as those at the crank end, as the stresses they have to bear are equally great.

DIFFUSED LIGHTING SYSTEMS.

Effect of Internal Obstructions on Performance.

In a well-diffused system of lighting, the absence of sharp shadows renders the effects of introducing masses of dark-coloured machinery, &c., much less apparent to the eye than they otherwise would be. There seems, in fact, to be a general opinion that, in such a system of lighting, the introduction of dark objects causes no noticeable shadow, and that therefore their presence can be neglected for all practical purposes, and the calculations of the flux required in a given room can be carried out without any regard to the presence of objects of this kind. That this view is fallacious, and that its application may lead to entirely wrong results, was demonstrated by Mr. J. W. T. Walsh, M.A., M.Sc., in a paper which he read at a meeting of the Illuminating Engineering Society held on Jan. 27 at the Royal Society of Arts.

ILLUMINATION AND SHADOW.

In daylight, the degree of illumination is excellent; and if a card be placed horizontally on the ground close to the base of a dark wall, no shadow will be noticeable on the card. Nevertheless it is well known that the illumination of that card is only about one-half of what it would be were the wall removed, and the card exposed to the whole hemisphere of sky. The wall does, in fact, produce a shadow on the card, and diminishes its illumination by about 50 p.ct. Let it be supposed that the card is placed on a table in the centre of a large room lighted by indirect units. The bright ceiling, which is the source of illumination, is equivalent to the sky; and if a large vertical sheet of dark material be placed on the table close to the card, the illumination of the card will be reduced to about one-half of its former value—and this without the production of any marked shadow on the table.

The application of these ideas to practical cases of diffused lighting systems shows the fallacy of the argument that absence of noticeable shadow implies absence of effect on the illumination, and indicates that where large objects are to be placed in the vicinity of working points, the illumination at those points cannot be calculated without reference to the size and position of these objects.

CALCULATION OF THE EFFECT OF ABSORBING OBJECTS.

It is not our intention to detail the method of calculation put forward by Mr. Walsh. It is an adaptation of a graphical method of calculating the daylight factor described by Messrs. P. J. and J. M. Waldram in 1923 [see "JOURNAL" for April 11, 1923, p. 103]. Mr. Walsh gave examples of the calculation of the "shadow factor" for a person seated at a table, and for machinery and other objects above the working plane. High machinery may cause a marked diminution of the illumination at considerable distances. A Jacquard loom, for example, may produce a shadow factor of about 30 p.ct. Further, the body of the operator may have a shadow factor of 10 to 15 p.ct., so that the actual illumination at the point of work is only slightly more than half that to be expected.

EFFECT OF REFLECTION.

In many cases reflection is negligible on account of the dark colour of the machinery or other object, but in other cases this reflected light must not be ignored. The light reflected from the obscuring object, however, cannot do more than halve the shadow factor (and it will generally do much less, since the reflection factor is not usually greater than 30 to 50 p.ct.) except when a considerable amount of light is reflected to it from below. A totally indirect system of lighting, said Mr. Walsh, is not suitable for the illumination of lace-making machines, &c., in which the lighting of a vertical surface is the important matter.

SEMI-INDIRECT SYSTEMS.

A semi-indirect system may, for convenience, be regarded as a combination of a direct and an indirect system. The relative intensities of the two systems naturally varies according to the type of fitting used, but for all practical purposes the light emitted in the upper hemisphere may be regarded as the indirect component, and that emitted downwards as the direct component. It is clear that in the case of a system for which the indirect and direct components are approximately equal, and in which the fittings are so arranged that no shadows are cast by the direct component, the shadow factor is reduced to one-half of its value for an indirect system.

EFFECT OF WHITENING ABSORBING OBJECTS.

It has sometimes been proposed to whiten as much as possible of the absorbing surfaces of objects within a room, so as to reduce the shadow effect. Though this is naturally of material benefit, the reduction of shadow effect by such whitening is comparativly small in an indirect system unless light is also received by upward reflection from the floor, bench, &c. In a direct system, however, if the surfaces which receive direct light from the sources are white, a considerable reduction of shadow may be produced.

In concluding his paper, Mr. Walsh said that in the design of a lighting system, whether direct, indirect, or semi-direct, the shadow effect must be carefully considered when the total flux necessary to produce a given illumination at the working plane is being calculated.

A FEW POINTS FROM THE DISCUSSION.

Mr. P. J. Waldram, in the discussion which followed, remarked that few terms were more abused than that of "diffused light." If this was regarded as direct light coming from innumerable sources, the problem of the shadows cast by it could be more readily understood. Many people thought that a vertical white surface could be as bright as the sky, but this was impossible; it could never be more than half as bright. Mr. Waldram is of the opinion that in textile mills indirect lighting is not desirable. Mr. L. E. Buckell considers that in all lighting schemes a more generous factor of safety—referred to by another speaker as the "factor of ignorance"—should be allowed. He thinks that many opportunities are lost by relying too much on theoretical calculations. Though he did not refer specifically to the electric lighting at Wembley last year, we think he had this in mind when he was making his remarks. Speaking of the illumination of churches and public halls, Mr. J. Darch drew attention to the fact that indirect lighting was often impossible, due to the structure of the roof. The best thing to do in these cases was to have direct lighting from units placed near the roof. Often, however, low and heavy rafters obstructed the path of the light; and when this was from gasfilled lamps, the shadows cast were very sharply defined.

Bringing the meeting to a close, the CHAIRMAN, Mr. Justus Eck, said that the subject to be dealt with at the next meeting, which would be held at the showrooms of the Gas Light and Coke Company, would be "Recent Progress in Gas Lighting." As a new feature, the Society had arranged to pay visits to various lighting installations of interest.

ECONOMY IN STEAM RAISING.

An Air Preheater for Boiler Firing.

In modern steam plants the heat contained in the flue gases is commonly utilized to heat the feed water by means of economizers. This, however, can be accomplished only within certain limits, because a large decrease in flue gas temperature would require an economizer of such large proportions that the first cost of its installation would not be justified by the effective saving in fuel. Also an economizer of such a size would show a low over-all efficiency on account of high radiation losses. The Howden-Ljungstrom Preheaters (Land), Ltd., of Glasgow, have brought out an air preheater, by means of which, they say, it is possible to extract a far greater part of the heat content of the flue gases than can be done practically by an economizer. The dimensions of this apparatus are much smaller than those of the economizer, its radiation losses are small, and first cost and maintenance charges are low.

ADVANTAGES.

A most important effect of the increase in furnace temperatures, obtained by preheating the combustion air, is that combustion and the transmission of heat to the boiler take place under favourable conditions, and, consequently, the saving in fuel is greater than that represented by the waste heat reclaimed from the combustion gases. Other benefits of the improved furnace conditions are the possibility of successfully burning low-grade fuel, increased steaming capacity of the boiler, and more flexible control in operation. Moreover, preheating of the combustion air leaves the possibility for the additional saving which can be obtained by heating the feed water by other means—for example, by utilizing exhaust steam from auxiliaries.

The manufacturers give a comparison between an economizer and a Howden-Ljungstrom preheater in a steam plant burning one ton of coal per hour. The air preheater cooled the flue gases from 572° to 212° Fahr., and resulted in a saving in fuel of 20·1 p.ct. The economizer cooled the gases to 338° Fahr., and showed a fuel saving of 8·6 p.ct.

WORKING OF PREHEATER.

Metal plate surfaces are carried alternately into the currents of waste gases and of cold air in such a way that in one part of the apparatus the gases give up their heat to the plates, in another part the same plates give up to the air the heat absorbed from the gases. Thus heat is actually transferred mechanically from the gases to the air. The gases and the air pass through the elements in opposite directions. This feature, together with the possibility of putting a large amount of heating surface in a small space, accounts for the large drop in temperature of the waste gases. The elements are cleaned by means of a radial pipe containing a number of steam jets, and the operation is performed in from 10 to 15 seconds.

Gas Station Engineers.—It does not appear to be generally known that station gas engineers are eligible for membership of the Institution of Engineers-in-Charge. Anyone interested can obtain all information from the Hon. Secretary: Mr. Alfred E. Penn, M.I.Mech.E., of 100, Earlsfield Road, London, S.W. 18.

CRANKLESS ENGINE AND COMPRESSOR.

Two crankless gas engines and gas compressors which have been supplied to the Australian Gas Light Company, of Sydney, by Crankless Engines, Ltd., of No. 6, Queen Street, Melbourne, formed the subject of an illustrated article in "Engineering" for the 23rd ult.

Each engine is rated at 50 B.H.P. when running at 750 R.P.M. and supplied with gas of 500 B.Th.U. At this speed the compressor is rated to deliver 200,000 c.ft. of gas per hour against a head of 60 in. of water—a very high volumetric capacity for a machine of so small a bulk. As a matter of fact, the discharge per minute is about 130 times the total bulk of the machine, and the volumetric efficiency has been found by test to be 96 p.ct. The arrangement of intake and delivery valves is such that the compressor is well adapted to work against varying pressures. Careful tests of the plant made prior to delivery, with the compressor running on air, showed that the mechanical efficiencies of the engine and booster were approximately 87 p.ct. over a considerable range of load, and that the gas consumption of the engine was slightly over ½ p.ct. of the air pumped. This figure, it is pointed out, would be appreciably reduced when the compressor was running on gas, as would be the case in actual service.

After about six months' experience with these two machines under commercial conditions, the Australian Gas Light Company are stated to have placed repeat orders for similar ones.

TRANSITION OF COAL TO COKE.

Mr. Eric Sinkinson, of Lehigh University, Bethlehem (Pa.), contributes to the January issue of "Industrial and Engineering Chemistry" some observations on the transition of coal to coke. The study of the electrical conductivity in the formation of coke from coals of Spanish and British origin has been extended to Pennsylvanian and other American coals; and the conductivity method has also been applied to study the gases produced by a thermal decomposition of coal. The conclusions arrived at by the author as the result of his investigations are that strongly coking bituminous coals require a greater degree of heat to liberate free carbon in them in transition from coal to coke than do less strongly coking coals. Strongly coking coals which have been exposed to the air for long periods of time gradually lose their coking properties by absorption of oxygen, and require a less degree of heat to liberate free carbon in them than they would require before exposure. Anthracites contain free carbon, and begin to show a rapid deposition of carbon indicated by their increase in conductivity, at a temperature comparable with the non-coking or poorly coking varieties of bituminous coal. There is evidence that gases or vapours themselves first decompose and yield a nucleus of free carbon in a fine state of division, upon which carbon is deposited from the other constituents of the coal body when it is heated. Furthermore, an assumption is made that, because the carbon particles are in a fine state of division, the force of cohesion between them is sufficient to account for the great strength of a good coke. Acetylene and ethylene decompose on heating and deposit carbon within the range of temperatures found for the initial conduction of coking coals. Therefore it is concluded that they and their homologues play an active part in coke formation. Furan (believed to be a constituent of humic bodies in coal), obtained by heating mucic acid, carbonizes also within the range of temperatures at which coals begin to conduct electricity when heated. When furan is destructively distilled, a hydrocarbon is liberated which a further heating decomposes, yielding free carbon in a fine state of division, and according to this condition is sufficient to yield the structure of a hard coke. Here is evidence of the coke-forming propensities of humic bodies.

A Memorial to the Late Lord Moulton.—The Rt. Hon. Walter Runciman is Treasurer of a fund that is to be devoted to a memorial to the late Lord Moulton. The matter is in charge of an influential Committee, and it is intended to establish a Lord Moulton Memorial Hall at Kingswood School, Bath, where Lord Moulton was educated.

Gas for Fish Frying.—The yearly expenditure on fried fish and potatoes in this country alone amounts to nearly £37,000,000. This striking figure shows that commercially-cooked fish forms a very considerable part of the daily food of large sections of the community, and thus emphasizes the importance of ensuring that this food shall be prepared under hygienic conditions. The current issue (No. 131) of "A Thousand and One Uses for Gas" is an illustrated record of the vast improvement which of recent years has taken place in the equipment of fish catering shops. In a great and rapidly growing number of cases coal (and the grime and soot connected with it) has been entirely banished. Gas has taken its place; and in almost every such case its cleanliness and efficiency have increased the sales of fish and potatoes to existing customers, and attracted an entirely new class of customers who have been impressed by the hygienic conditions under which the food is now prepared.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Mr. Wilson's Paper on Complete Gasification by the Tully Method.

SIR,—Referring to your leader on page 192 of last week's issue of the "JOURNAL," in regarding the question of costs in gas manufacture one should keep strictly to the point. I did not speak about last year's prices for coke. My paper referred to to-day's markets and to the present cost of producing gas. You have set up a hypothesis which, as such, is very interesting. But can you sell your coke at the price you name? What is the cost of manufacture to-day acccording to your plan?

You state that at the present time more than 66 p.ct. of the cost of coal is returned as revenue from residual products; 72 per cent. is returned at the Halifax Gas-Works. We manufacture gas from day to day in quantities sufficient to replenish our stocks. Why should we manufacture coke, tar, ammonia, or any other secondary product in quantities more than sufficient to replenish stocks? What we do in regard to the primary product should be good enough for the secondary product. Make what you can sell.

JACK WILSON.

30, *Kliffen Place, Halifax, Jan.* 31, 1925.

SIR,—I notice in the report of the discussion on Mr. Wilson's paper entitled "Complete Gasification—The Tully Method," I am reported to have said, on p. 219, col. 1, "The amount of CO_2 should not be so high. A content of 3 p.ct. was to be expected with highly superheated steam." This should read: "The amount of CO_2 should not be so high with steam so highly superheated as Mr. Wilson is using, for with a steam of such properties a content of 3 p.ct. was to be expected." Then, further down, where I made reference to the shutting off of the blower during the middle of a run, you have omitted to report that I stated the necessity for re-starting the blower to clear the blast main of any accumulation of gas from leakage.

With reference to the question of corrosion, I mentioned in the discussion that there was no extensive corrosion with purified mixed gas containing up to 80 p.ct. of Tully gas. There was never more than 30 grains per 100 c.ft.—*i.e.*, something like what is usually found in ordinary gas-works practice. The corrosion to which Mr. Wilson referred was with crude gas, which I admitted is highly corrosive, as is also other unpurified water gas.

In any of the statements I made with reference to Tully plants, I was speaking of other works with which I have been connected, as we have no Tully plant at Wakefield.

CECIL H. CHESTER,
Assistant Engineer and Manager.

Wakefield Gaslight Company,
Jan. 30, 1925.

180 Therms in Gas, and no Coke, versus 72 Therms in Gas, and Coke.

SIR,—I should like to say, if you will permit me, that the problem your editorial in this week's issue of the "JOURNAL" on "Complete Gasification by Tully Plant" sets out to deal with is one for an accountant. On what the argument is founded—that 72 therms and (say) 10 cwt. of coke is as good as 180 therms and no coke—is not quite clear.

If it be assumed that in one case the credit side of a balance-sheet is as follows:

Cr.

By sales—

72 therms of gas at 1s. per therm	= £3	12 0
10 cwt. of coke at £2 per ton	= 1	0 0
	£4	12 0

And in the other case:

Cr.

By sales—

180 therms of gas at 1s. per therm	= £9	0 0

Then, if the writer of the editorial, or some of your readers, will fill in the debit sides to these two sets of figures, I think it will go some short way towards a solution.

GEORGE HELPS.

Nuneaton Gas Company,
Jan. 30, 1925.

Municipal Profits and the Rates at Birmingham.—The Birmingham Finance Committee state that, if the rates of the city are to be kept at 16s. in the pound, a substantial contribution must again be made from profits by the Gas, Electricity, and Tramways Departments. Last year these three departments contributed £100,000; but this year there is a keen controversy—the Gas and Electricity Departments arguing that it is impossible to afford such relief. Negotiations are, however, being continued. The Gas Department state that wages are up and residual prices seriously down.

Newport (Mon.) Gas Company.—The report of the Directors for the year ended Dec. 31, 1924, will be presented next Monday. A final dividend of 5 p.ct. on the consolidated stock for the half-year ended Dec. 31 is recommended. The calorific value of the gas was increased to 450 B.Th.U. on March 10, and the price was reduced by 1d. per therm from the March meter readings. A further reduction of 1d. per therm was made in June to consumers in outside areas. The Directors record with regret the death of Lt.-Col. A. H. Laybourne, J.P., who had been a member of the Board for thirteen years.

REGISTER OF PATENTS.

Cooling Coke.—No. 225,503.

FÜLSCHER, J., of Hamburg-Eimsbüttel.

No. 11,945; May 14, 1924. Convention Date, Nov. 28, 1923.

This invention relates to a modification of that claimed in patent No. 208,557 [abstracted and illustrated on p. 882 of the "JOURNAL" for Sept. 17, 1924].

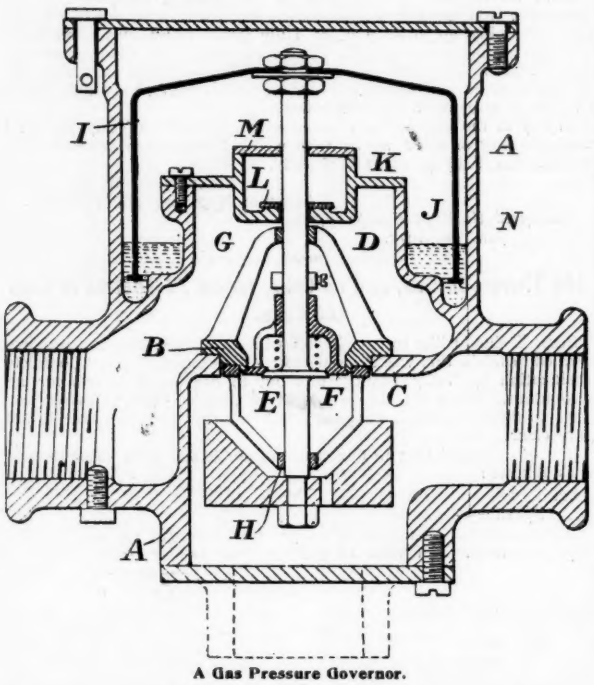
According to this invention, means are provided below the distributor for producing a chamber in the coke in the lower part of the container, so that the cooling gases are caused to pass through such coke into the distributor by the most direct or rapid path. The actual means employed to secure this end may vary; but preferably a basket-like member or frame, conveniently adapted to swing, is mounted within the container below the distributor. Thus an additional cooling is imparted to the coke as it moves towards the discharge outlet, and the cooling gas supply pipe which hitherto led directly into the base of the distributor (and here to some extent interfered with the downward movement of the coke), can be omitted.

Governors.—No. 225,991.

DOBSON, E., and FOSTER ENGINEERING CO., LTD., both of Morden Works, S.W. 19.

No. 27,230; Oct. 30, 1923.

This invention relates to gas pressure governors of the kind in which a mercury sealed bell or diaphragm subjected to the outlet pressure of the gas is employed to regulate the amount of lift imparted to the valve or valves. In governors of this kind, the patentees say, the valves are liable to develop an oscillating or chattering movement which causes the gas to issue at a fluctuating pressure, and this, in turn, transmits a flicker to the lights dependent upon the supply so controlled. The present invention is intended to overcome this disadvantage.



A Gas Pressure Governor.

The governor illustrated comprises a valve casing A having a removable horizontal seating ring B on a web C and a spindle D carrying pilot and main valves E and F respectively, which operate on the pressure side of the seating. This spindle slides in guides G and H above and below the valve seating B, and is connected at its upper extremity with a mercury sealed bell I located in a closed chamber above the gas outlet space. This closed chamber and the gas outlet space are separated by a web J and an externally flanged cup-shaped member K secured to the upper edge of the web. The valve spindle D passes through K, which—together with washers L and M closely surrounding but free to slide with respect to the spindle and engaging the bottom and the rim of the cup respectively—forms a separate chamber more or less isolated from the adjacent spaces. The washers L and M are capable of sliding with respect to the spindle and fit closely to the adjacent surfaces of the cup member.

It is claimed that the provision of the substantially closed chamber between the gas outlet space and the interior of the floating bell ensures a more gradual transmission of pressure changes from the gas outlet space to the interior of the bell, and the liability of oscillation of the bell and the valves is therefore avoided. As the washers L and M are loose upon the spindle, there is a ready passage for gas to the interior of the bell to respond to fluctuations of pressure experienced in normal working, so that the governor is not sluggish in action. By providing the lower rim of the bell with a flange immersed beneath the surface of the mercury, a dash-pot action is obtained also tending to prevent chattering or oscillating of the valve.

Burner for Testing Gas Flames.—No. 226,595.

HELPS, G., of Nuneaton.

No. 23,582; Sept. 21, 1923.

This invention refers to burners for the testing of gas flames. The device consists of a bunsen burner with a long metal burner tube over which another metal tube slides in such a manner that as it reaches the flame it can lift the outer cone of flame off the burner head. The sliding tube has windows in it for allowing the inner cone of the flame and the combustion to be seen. The windows may be of glass or any other suitable material, and are airproof. The sliding tube has a stuffing box at the lower end.

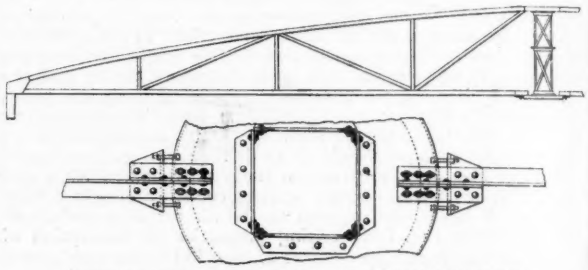
By means of this burner the flame produced from a completely combustible mixture will burn on the burner head without any further air being admitted, although the burner head is well below the top of the outer tube. If the flame requires secondary air, then the flame divides, and that portion that is being consumed with the primary air is to be seen on the burner head, and the outer portion that requires secondary air will burn on the end of the outside tube.

Gasholder Framework.—No. 226,655.

WESTWOOD & WRIGHTS, of Brierley Hill.

No. 28,556; Nov. 13, 1923.

This invention relates to the framework of gasholders, and has for its object the simplification of the construction of the top framing whereby expensive forgings and smith's work are eliminated. At the same time the framing is materially strengthened and the original circular shape of the top curbs maintained under all pressures from wind or gas.



Gasholder Top Framing—Messrs. Westwood & Wrights.

The invention consists in the main trusses being formed by triangular girder structures, pairs of which are arranged in line with each other from curb to curb to constitute a diameter and thereby resist any stresses of compression or tension; the base of each truss being disposed in the same horizontal plane.

The design of a truss and its connections to the central lattice-work pillar are clearly shown in the front elevation and detail plan which we reproduce.

Manufacture of Carburetted Water Gas. No. 226,630.

GLASGOW, A. G., of Victoria Street, S.W. 1.

No. 24,833; Oct. 5, 1923.

Introducing his invention, the patentee points out that in the practical manufacture of carburetted water gas the process is intermittent, and the distinguishing economic feature consists in utilizing the heat energy of the blast gases issuing from the generator during the blow for subsequently gasifying the enriching oil in the presence of the hot water gas concurrently produced.

When a rich carburetted water gas is produced, necessitating a large proportion of oil gas, practically the whole of the potential energy of the generator blast gases can be utilized for the gasification of this oil by complete combustion of its CO content with secondary air in the fixing chambers; but when, as is now general, gas of lower calorific value is produced and a smaller proportion of oil gas is required per volume of blue water gas, it is sometimes impracticable to reduce the percentage of CO in the generator blast gases to merely the proportion which is required to gasify this small quantity of oil—hence the balance of the CO passes away to the atmosphere and is wasted unless burnt in special waste-heat boilers.

The length and rapidity of the blow are regulated by the necessities of the generator fire and other practical considerations; and the present method of operation is to burn in the fixing chambers, either throughout the blow or, more usually, as late in the blow as possible (to prevent flaming and roaring at the stack), as much of the CO as is required to attain the correct temperatures for the gasification of the oil, the remaining CO going to waste with the products of combustion (where waste-heat boilers are not employed).

The object of this invention is to utilize the potential heat which thus goes to waste as CO in these generator blast gases; and according thereto practically the whole of the CO contained in the generator blast gases is burned in the fixing chambers from the commencement of the blow until the temperature required in the fixing chambers is reached, when the secondary air is shut off. After a few seconds to clear the fixing chambers of the products of this complete combustion, the stack valve is closed; the generator blast being continued until the fuel bed has reached the desired temperature. The blast gases richest in CO, formed in the hot fire during the latter

portion of the blow, are then pushed forward by the generator blast pressure into the relief holder or elsewhere, and mixed with the carburetted water gas, thus saving valuable therms without any additional cost.

If so much CO is saved that its accompanying diluents depreciate too much the calorific value of the final gas, this can be readily rectified by prolonging, to the extent required, the period of complete combustion (in the fixing chambers) of the CO in the generator blast gases, and gasifying additional oil—the gas from which usually costs less per therm than the original carburetted water gas, as made without employing this invention.

Even when waste-heat boilers are used, it may be preferable at times to utilize the CO in accordance with this invention.

Gas Meters.—No. 226,705.

BATT, W., of Newcastle-on-Tyne, and CAIRNS, M., of Washington Station.

No. 4346; Feb. 20, 1924.

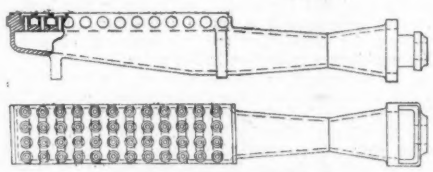
According to this invention, the bellows of a dry gas meter are provided with a central metal disc of dished form having a turned-over periphery on the inside of which the centre portion of the diaphragm is secured by means of a wire ring, or by another disc which is sprung into the turned-over periphery of the disc. The wire ring grips both the diaphragm and the metal disc, stretching the former over the concavity of the latter, and so forming an air space between the diaphragm and the disc.

Atmospheric Burners.—No. 226,908.

WILKINSON, G., of Harrogate.

No. 26,282; Oct. 22, 1923.

The object of this invention is, by simple means, to increase the useful effect from a given consumption of gas by a secondary supply of hot air, and produce a more perfect and intense combustion. The patentee employs a bunsen burner comprising a burner head in the form of a thick plate provided with a number of outlet nozzles for the gaseous mixture, each nozzle terminating below the upper surface of the plate and projecting upwardly within a concentric recess supplied with secondary air through one or more ducts passing through the burner head and leading into the base of the recess. The annular recess round each nozzle allows this secondary air to envelop the flame at its root before it emerges and completes its combustion above the burner head.



A High Efficiency Burner.

One design of burner according to the invention is shown in the part-sectional elevation and the plan herewith. It will be seen that the burner head is of substantial thickness so as to provide long holes for the passage and emission of the mixed combustible; each jet being located in an upstanding boss which in turn is surrounded by the annular air space which breaks into a transverse air duct. Thus each burning jet induces a current of air along its respective air duct, which air becomes heated in its flow and reinforces combustion at the actual point of burning. This induction of heated air is increased or diminished as the amount of combustible varies. Thus the efficiency is kept high all along the working range of the burner. Moreover, when the jets are turned down to a minimum they are below the surface of the face of the burner head, and shielded from air currents thereby, which otherwise might cause their accidental extinction. The long holes through the solid metal form a valuable prevention against back-fire when the burner is turned very low.

Venting of Gas Cookers.—No. 226,920.

STIMSON, E. F., of Tooting Bec Common, S.W. 17.

No. 27,655; Nov. 3, 1923.

This invention relates to venting the ovens of gas cookers heated by an external burner communicating with the interior of the closed-bottom oven through an aperture in the side thereof. The object is so to vent such ovens that the temperature therein is maintained uniform and the heat conserved, thus economizing the consumption of gas.

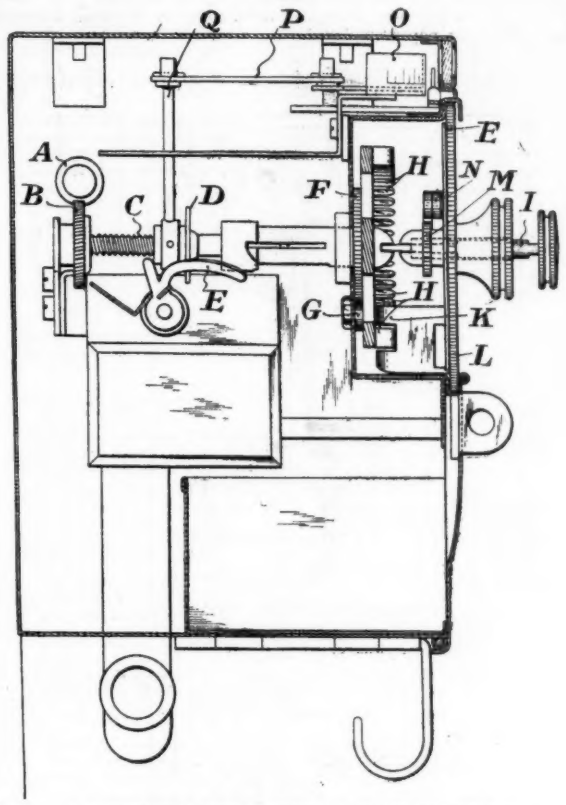
The burner aperture is in the lower part of the side of the oven, and the vent may be located at the side or floor of the oven remote from the inlet for the products of combustion or, with an inlet on two sides of the oven midway between the two inlets, or at some intermediate situation. The level of the vent may be just above that of the inlet, or elsewhere, so long as the gases have to descend the major portion of the oven prior to escaping.

Gas Meters for Hotels, &c.—No. 226,972.

SUTHERLAND, A. G., LTD., and MACE, B. E., both of Birmingham.

No. 32,383; Dec. 28, 1923.

This invention relates to prepayment gas meters, and particularly tributary prepayment meters such as are used in the bedrooms of hotels, boarding houses, and the like, in circumstances in which the occupant of the apartment pays for the amount of gas consumed. Tributary meters of this character are usually fed from a main meter, for the amount registered of which the proprietor is responsible, himself receiving the amount introduced into the tributary meters.



A "Tributary" Meter.—Messrs. A. G. Sutherland, Ltd.

We reproduce a side sectional elevation of a convenient embodiment of the present invention. A meter of any approved form is adapted to rotate a worm A in mesh with a wormwheel B which is axially immovable but rotable upon a spindle C (hereinafter called the main spindle) with which it has a screw-thread connection. This spindle rigidly carries a flange D which engages with the gas valve E, and the spindle at its front extremity is adapted to rotate with, but slide in relation to, a ratchet wheel F, which co-operates with a pawl G mounted upon the crown wheel H of the prepayment mechanism. This pawl and ratchet engagement is of a character such that it offers sufficient resistance to permit of the counter-clockwise rotation of the crown wheel H through the intermediary of the coin in circumstances in which the spindle C is thereby rotated, while permitting of rotation of the spindle in a clockwise direction by the key I in circumstances in which the crown wheel H is restrained from clockwise rotation by a suitably incorporated pawl.

A coin carriage K is incorporated in appropriate relationship with the crown wheel H, being mounted rotably in an adjustable cover plate L; and a ratchet wheel M is mounted co-axially with the carriage, the ratchet wheel being restrained from movement in one direction by a pawl N mounted at the back of the cover plate L. This ratchet wheel M has a key connection with the key I utilized to restore the valve to zero, which connection is of a character such that this key can be rotated in one direction only—as requisite to obtain restoration of the gas valve E to its zero position. The key I extends beyond this restricting mechanism, and has a screw-driver or equivalent engagement with a member rigid with the secondary wheel F. This member includes a sleeve extension rigid therewith and having a pin-and-slot connection with the main spindle, so that when the sleeve is rotated in a clockwise direction the spindle is likewise rotated and, by virtue of its screw-thread, displaced axially to restore the main valve to its zero position.

The pin and slot connection between the sleeve and the main spindle is such that it serves to limit the extent to which the prepayment mechanism can be operated by the key, thereby relieving the mechanism of the meter proper from any strain to which it might otherwise be subjected.

O is a rotable indicator operated through a link P pivotted eccentrically to the indicator and coupled pivotally at its other extremity to a rod Q, which is secured to a ring rotable about, but axially immovable in relation to, the spindle C.

Determination of Hydrogen Sulphide.—No. 227,039.

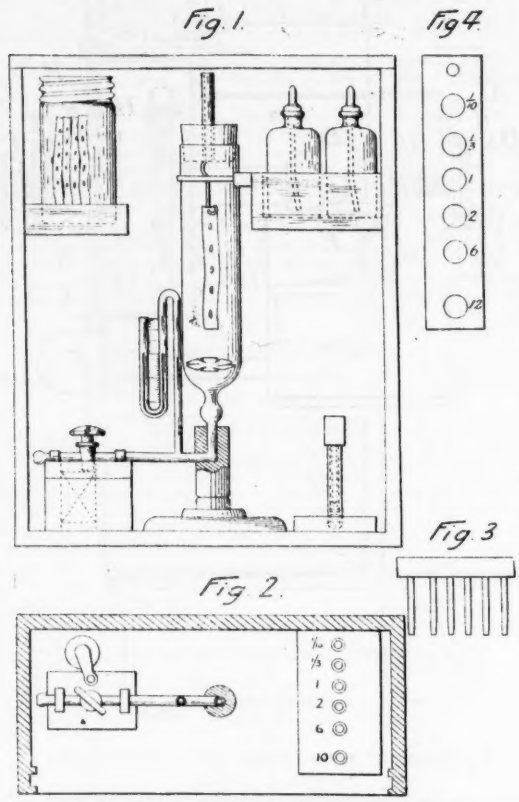
HUMPHREYS & GLASGOW, LTD., of Victoria Street, S.W. 1. (A communication from W. H. Fulweiler, of Wallingford, Penn.)

No. 11,751; May 12, 1924.

The principal objects of the present invention are, first, to provide a rapid test for comparatively small quantities (such as 1-10th of a grain to 12 grains per 100 c.ft.) of hydrogen sulphide in illuminating and other gas, that can be conducted by comparatively unskilled persons such as the men employed in the purifying house of a gas-

works; and second, to provide portable, compact, simple, reliable, and efficient means for the test

Fig. 1 is a front view of the apparatus with the front cover removed; fig. 2 is a section on the line 2—2 of fig. 1; fig. 3 is a side view of one of the parts shown in fig. 1; and fig. 4 is a view, drawn to an enlarged scale, of the carrier or strip of Whatman hardened filter paper employed.



Works Test Apparatus for Hydrogen Sulphide.

The receptacle is provided with a hinged cover and a detachable sliding front. Within the cabinet there is arranged a standard form of hydrogen sulphide tester; and the gas under test is passed through it at, for example, the rate of 5 c.ft. per hour for one minute. This tester comprises a vessel having a detachable stopper fitted with, for example, a 5-ft. Bray burner and with a hook. There is a deflector in the vessel. The gas inlet is provided with a valve and with a pressure gauge, the purpose of which is to facilitate the maintenance of the desired rate of flow. There is a sand glass adapted to measure, for example, intervals of one minute; and it is detachably mounted in the cabinet by a spring. A jar contains strips of filter paper; and there is a stand for the bottles for the various salt solutions. The latter are picked up from a series of vials by a comb (fig. 3) and transferred thereby to the corresponding positions on the filter paper.

The compounds or solutions used, arranged in the order of sensitiveness, are as follows:

1. Silver sulphate (Ag_2SO_4)	Saturated water solution. Gray black sulphide.
2. Copper sulphate (Cu_2SO_4)	5 p.ct. water solution. Black sulphide.
3. Antimony trichloride ($SbCl_3$)—dissolve by adding HCl.	3 p.ct. water solution. Orange sulphide.
4. Cadmium chloride ($CdCl_2$)	5 p.ct. water solution. Yellow sulphide.
5. Mercuric chloride ($HgCl_2$)	3 p.ct. water solution. Black sulphide.
6. Bismuth trichloride ($BiCl_3$)—dissolve by adding HCl.	3 p.ct. water solution. Brown sulphide.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Jan. 28.]

Nos. 1524 to 2229.

BAYLEY, J. C.—"Device for controlling supply of gas to burners for liquid boiling." No. 1745.

COOKE, A. G.—"Stuffing-boxes for gas-meters, &c." No. 1660.

DOVEL, J. P.—"Gas cleaning apparatus." No. 1860.

LORENZEN, C., and LORENZEN-TURBINEN-AKT.-GES.—"Gas turbines." No. 1854.

MORE, G. W.—"Gas grill and towel airer." No. 2149.

PHAROS FEUERSTÄTTEN GES.—"Gas-heated heating-element." No. 1957.

PHILLIPS, B. C.—See Cooke, A. G. No. 1660.

RAZEN, SCHAEFER, ET CIE.—"Gas burners." Nos. 2026, 2028.

RIGG, G.—"Separation of dust, &c., from gases." No. 2216.

SCHAEFER, H.—"Gas burners." No. 2028.

SCHMUCK, H.—See Pharos Feuerstätten Ges. No. 1957.

SUFFERN, E. S.—"Generation of gas." No. 2110.

MISCELLANEOUS NEWS.

GAS REGULATION ACT APPLICATIONS.

There have appeared in the "London Gazette" the following further notices regarding applications to the Board of Trade under the Gas Regulation Act.

SPECIAL ORDER.

Northampton Gas Light Company.

Application is to be made by the Company to the Board of Trade for an Order under section 10 to extend their limits of supply so as to include various parishes which are named, to make further provisions as to the powers of the Company to purchase and sell gas in bulk, and for other purposes.

AMENDING ORDER.

Wandsworth, Wimbledon, and Epsom District Gas Company.

As the result of the inquiry on the application of the County Council (and reported in the "JOURNAL" for Dec. 10, p. 733), the Board of Trade have given notice that they propose to reduce the standard prices of the Wandsworth, Wimbledon, and Epsom District Gas Company from 16·6d. to 14d. per therm in the Wandsworth and Epsom areas, and from 14·6d. to 12d. per therm in the Wimbledon area.

STOCKTON AND THE HAVERTON HILL GAS-WORKS.

Ratepayers in Favour of Purchase.

Great interest was evinced in a poll of electors which took place at Stockton last Thursday upon the Parliamentary Bill promoted by the Corporation, who are seeking, among other things, to purchase the Haverton Hill Gas-Works at a cost of about £25,000.

A recent Town's Meeting was held relative to the Bill; but, consequent upon Labour Party action, the gas-works proposal was defeated, although the proposed purchase is on all fours with the Corporation's action a year ago in acquiring the Yarm Gas Company's works. Evidently the Labour Party object to municipalization extension in the direction of an enlarged area of gas supply!

Speaking at a meeting of the Chamber of Trade on Jan. 26, Alderman J. Goldstone stated that 31 members of the Corporation, all business men in responsible positions, after going thoroughly into all the details, regarded the project as being in the best interests of the town. Not only was it a sound investment at present, but it was one which, by increasing the consumption of gas, would be of benefit by enabling a reduction in the price.

Alderman J. McNaughton (Chairman of the Gas Committee), in a letter to the Press, endorsed the Corporation's policy. The Haverton Hill Gas Company's balance-sheets, he said, had been examined on behalf of the Corporation by Mr. A. Valon, of Westminster, who advised them that the undertaking was well worth acquiring at £25,000. The actual figure in the agreement of purchase was £24,155; and to couple up the works so that gas could be supplied from Stockton would entail an estimated expenditure of £9300.

Less than one-fifth of the electorate—5582 persons—voted; but the result was a clear indication of public support for the Corporation's proposals. Thus, the only tangible effect of the Labour Party's efforts to smother the Bill has been to mulct the ratepayers in an expense of between £400 and £500 in taking a poll.

The voting paper was in the form of seven clauses. Clause 1 had reference to the purchase of the Haverton Hill Gas-Works, and there was a majority of 1359 in favour of this section of the Bill; 3650 votes being cast for and 2291 against.

IDEAL HOME EXHIBITION.

Fresh Features at Olympia in March.

The Ninth Ideal Home Exhibition, organized by the "Daily Mail," will be held at Olympia, London, from March 2 to 25, and will contain many new features. In the New Hall will be a delightful village in a scenic setting reminiscent of the Cotswold Hills. There are to be ten houses, each solidly built and fully furnished as if occupied. The varied types of buildings range from ancient half-timber to the latest idea in steel dwellings. In the centre is a village green, through which runs a stream spanned by an old-world bridge of stone. Her Majesty the Queen is honouring the exhibition by allowing her Doll's House to be on view in the New Hall, and this wonderful mansion in miniature will stand in a pavilion which Sir Edwin L. Lutyens, R.A., has specially designed for the occasion.

The annexe of Olympia is to be transformed by leading landscape gardeners into a fairy-land of flowers, giving the effect of midsummer in March. There will be twelve kinds of differently designed horticultural plots for the home, and also a Japanese tea-garden where visitors may have refreshments served by girls in native costumes, and where an orchestra will play.

In a new section of the exhibition craftsmen of many lands will be seen at work on home-beautifying tasks. British workers will demonstrate the making of jewellery, lace, embroidery, hand-woven wear, shell-flowers, gloves, leather and metal goods, pottery, stained glass, and wood carving. At stands characteristic of their countries, peasant workers from Egypt, Armenia, Poland, Palestine, the Canary Islands, Burma, and all parts of the Orient will be seen at work with the primitive tools of their varied crafts. Furnishing displays are so all-embracing that it will be possible to equip and decorate a house of any size without leaving Olympia. An all-gas house and an all-electric house will show, in the most practical way, the advantages of both systems for domestic lighting, heating, cooking, and power.

TOTTENHAM DISTRICT LIGHT, HEAT, AND POWER COMPANY.

Revision of Standard Price.

An application by the Middlesex County Council to the Board of Trade for an Amending Order, under section 1 (3) of the Gas Regulation Act, revising the standard price of gas supplied by the Tottenham Light, Heat, and Power Company, was the subject of an inquiry before Mr. H. C. HONEY (Director of Gas Administration at the Board of Trade) on Monday and Tuesday, Jan. 26 and 27.

As in previous cases in which a revision of the standard price has been applied for under this section of the Act, the Tottenham Company admitted that there was a case for a revision, and the only matter for the Board of Trade to decide was the actual figure to be adopted.

The Middlesex County Council were represented by Mr. F. J. WROTTESLEY; and the Gas Company by Mr. W. E. TYLDESLEY JONES, K.C., and Mr. JACQUES ABADY.

THE CASE FOR THE COUNCIL.

Mr. WROTTESLEY said the Amending Order was applied for because the cost of production and supply of gas had decreased since the present standard price was fixed. There were five urban districts within the area of supply of the Company, and the County Council represented them all. The Company was a sliding-scale one; the slide being governed by the Act of 1898, as amended by subsequent legislation. The standard price under the 1898 Act was 3s. 8d. per 1000 c.ft., equivalent to 8·8d. per therm. The capital consisted of "A" and "B" stock, carrying dividends of 5 and 3½ p.ct. respectively; those dividends being subject to an increase or decrease of 2s. 6d. p.ct. inversely with every variation of 1d. per 1000 c.ft. in the price of gas above or below the standard of 3s. 8d. In 1913, operating under the 1898 Act, the selling price was 2s. 1d. per 1000 c.ft., and, since this was 19d. below the standard price, the Company were entitled to pay £7 7s. 6d. dividend on the "A" stock and £5 17s. 6d. on the "B" stock. Those were the dividends actually paid, and the present proposals of the Middlesex County Council would, in their view, enable dividends to be paid in future at those rates. In 1921 the Tottenham Company had obtained a Therm Order from the Board of Trade, under which the standard price became 17·6d. per therm, which compared with 8·8d. (the equivalent of the standard price under the 1898 Act). At that time, prices were at or near their peak. Under the Order the slide was fixed at 2s. 6d. for every 0·2d. per therm increase or decrease on the standard price. Thus, the increase in the standard price obtained under the 1921 Order was 8·8d. per therm, the sole purpose of which was to enable the Company to meet the increased costs of manufacture and distribution since June 30, 1914. The actual charge for gas in the first half of 1923 was 10·4d. per therm; in the second half, 10d.; for the first half of 1924, it was 9·8d.; and for the second half, 9·4d. In the first half of 1923 the Company were authorized to pay, on the "A" stock, 9½ p.ct., and actually paid 8 p.ct.; and on the "B" stock they were authorized to pay 8 p.ct., but paid 6½ p.ct. In the second half of that year they were authorized to pay 9½ p.ct. on the "A" stock, and paid 8 p.ct.; and on the "B" stock they were authorized to pay 8¼ p.ct., but paid 6½ p.ct. Thus, they had paid 12s. 6d. p.ct. more than in 1913.

The standard price which, in the view of the County Council, should be adopted in the present Amending Order was 13·02d. per therm. The Council had taken the published figures as shown in the 1923 accounts of the Company (these being the latest complete figures available) as the basis in arriving at the standard price which it was suggested should be adopted. These figures were then compared with those of 1913. It might have been to the advantage of the Council to compare the 1923 costs with those of 1914; but at the beginning of 1914 the Enfield Gas Company's undertaking was transferred to the Tottenham Company, and the latter were entitled to charge differential prices in the Enfield area, though the differential had since disappeared. As Enfield consumers were paying a higher rate than the consumers in other parts of the area in 1914, it might be that the cost of supply in 1914 was higher than in 1913; but the County Council had adopted the 1913 figure so as not to take advantage (if there were any) of the increased costs in 1914. The Council estimated that the increased cost at the present time over the costs of 1913 was 4·34d. per therm, instead of 8·8d., which was estimated in 1921. In addition to this, however, the Council had estimated that the working of the Company had deteriorated to the extent of 0·12d. per therm—*i.e.*, the costs of supply had increased by this amount through factors which were within the control of the Company. Under the Gas Regulation Act, the Council were entitled to ask that the former efficiency should be maintained; and therefore from the 4·34d., which was the increase of costs over those of 1913, there should be deducted 0·12d. Thus the increase of costs over 1913 actually was 4·22d., which, when added to the 8·8d. (standard price in 1913), gave a figure of 13·02d. per therm. This meant a reduction of 4·58d. per therm from the 17·6d. per therm which was the standard price authorized in 1921. In further justification for putting forward the figure of 13·02d. per therm as the new standard price, Counsel said that in 1923 the total cost of supply, as shown by the Company's figures, was 8·22d. per therm, which was less than the amount allowed in 1921 as the extra cost over the cost of 1913. The present charge for gas was 9·4d. per therm; and assuming —as he was entitled to do—that the Directors had fixed this price in order to give the shareholders the same profit as they were earning in 1923, then the price charged to the consumer to-day would point to a present-day cost of supply of 7·78d. per therm. If this were so, then the results were better than the proposed new standard price would indicate, and the Council were well within the mark in suggesting 13·02d.

MR. ARTHUR VALON'S EVIDENCE.

Mr. *Arthur Valon* (Messrs. W. A. Valon & Sons, Civil Engineers), who has advised the County Council, after corroborating Counsel's statement, referred to the quality of gas supplied by the Company. Previously, he said, the prescribed illuminating value of the gas was 14 c.p., but in 1921 the thermal standard was adopted, and the declared calorific value was 500 B.Th.U.

A number of tables were then handed in, giving details of the calculations made by Mr. Valon in arriving at the new standard price. In arriving at costs, he had used the 1923 figures as a basis, and had adjusted them where he considered it necessary, to meet present-day conditions. Of the tables submitted, we give the following, which are self-explanatory:

Estimates of Increase in Cost within the Control of the Company.

	1913.		1923.
Coal gas made (therms per ton)	72·02	..	68·42
Coke available for sale (cwt.)	9·19	..	7·21
Breeze made (cwt.)	1·43	..	4·10
Tar made per ton of coal (gallons)	11·3	..	9·5
Liquor made per ton of coal (gallons)	30·4	..	28·3

	Tons.	£	£
Coal, 158,278 tons at 31s. 10d.			251,926
Less—			
Coke at 9·19 cwt. per ton of coal.	72,729		
Carburetted water gas (as 1923)	11,309 at 25s.	14,136	
Balance	61,420 at 26s. 9d.	82,149	
	72,729	£96,285	
Breeze at 1·43 cwt. per ton of coal, 11,317 tons at 9s. 9·72d. per ton		5,551	
Tar at 11·3 gallons per ton of coal, 1,788,541 gallons at 4·91d.		36,591	
Liquor at 30·4 gallons per ton of coal, 4,811,651 gallons, or 44,552 butts at 5s. 2d. per butt.		11,509	
			149,936
Net cost of coal (1913)			£101,990
Present net cost of coal			108,987
			£6,997

equals 0·63d. per 1000 c.ft., or 0·12d. per therm, increase over 1913.

Estimate of Standard Price.

	Pence per Therm.		
Standard Price—			
Fixed by Board of Trade	17·6		
Pre-war standard price, 44d. at 500 B.Th.U.	8·8		
Increase in cost of supply under Gas Regulation Act, as found by Board of Trade			8·80
Estimate of present cost of supply—			
40·29d. per 1000 c.ft. at 503 B.Th.U.		8·01	
Pre-war cost of supply—			
Year to December, 1913	19·67		
Less bad debts, £276	0·03		
At 535 B.Th.U.	19·64	3·67	
Increase in cost over pre-war		4·34	
Deduct increase in cost within the control of the Company		0·12	
			4·22
Fall in cost of supply since 1921			4·58
Existing standard price			17·60
Proposed new standard price			13·02

The following estimate of a new standard price based solely on the 1923 accounts was also handed in. It shows a lower standard price than the Middlesex County Council have put forward:

	Pence per Therm.		
Cost of supply in 1923 accounts as per statement accompanying the application of the County Council—			
41·37d. per 1000 c.ft. at 503 B.Th.U.			8·22
Less drop in cost as shown by fall in price of gas—			
Average price in 1923	10·2		
Present price	9·4		
		0·80	
Deduct contributions to renewal fund and insurance fund £20,000, or 1·79d. per 1000 c.ft., or		0·36	
			0·44
			7·78
Pre-war cost of supply			3·67
Increase in cost over pre-war			4·11
Increase in cost found by Board of Trade			8·80
Fall in cost of supply			4 69
Existing standard price			17·60
New standard price			12·91

Mr. W. E. TYLDESLEY JONES, K.C., in cross-examining witness, confined himself to an examination of Mr. Valon's figures in so far as they disagreed with the figures estimated by the Company. In regard to the net cost of coal, he put a number of questions concerning the effect upon that of the conditions of the markets for residuals at present. In arriving at his net cost of coal, which was £108,987, or 9·75d. per 1000 c.ft., Mr. Valon had taken the net price realized for coke at 26s. 6d. per ton, which gave a revenue of £95,876, or 8·58d. per 1000 c.ft. Counsel pointed out that the export market for coke was at the moment very seriously depressed, and that the London Gas Companies were accumulating stocks of coke as a result.

Witness agreed, and admitted that this was probably partly due to the altered conditions on the Ruhr.

COUNSEL said that the Tottenham Company sold coke in the local markets, and that if the London Companies could not export their

coke, they would flood the local markets, on which the Tottenham Company at present depended. This would seriously affect the price of coke, and he asked Mr. Valon if he had considered this.

Witness said he had, in the following manner. He had taken the price of coal at present paid by the Tottenham Company, under their contracts, but not the present market price. There was a prospect of a drop in the price of coal, and they had that amount to set off against the drop in the price of coke. It was impossible to deal with the price of coal in one water-tight compartment and the revenue from coke in another; and to say that he was going to keep the price of coal up in his estimate because it was up at the moment, and that he was going to make a reduction in the revenue from coke which he expected to get in the future, would lead to an absolutely ridiculous estimate. He had adopted the 1923 revenue from coke, which was lower than the one in 1924, and lower than the amount which would be obtained at the existing price.

Mr. TYLDESLEY JONES pointed out that the position in the Ruhr had developed in 1924, and witness had taken the price of coke in 1923, when the position as regards the export coke was entirely different from what it was to-day. With regard to coal, Counsel said that the Company had contracts running into 1926. He suggested that the Company would not benefit by the anticipated reduction in price.

Witness said he did not know this. He had been told that the contracts made by the Company in June, 1924, would expire at various dates between June and September of this year.

COUNSEL pointed out that there was unrest among the miners. In view of this, he asked if Mr. Valon was still of the opinion that there would be a drop in price.

Witness said it was a fact that recently coal could be bought on forward contracts, from June, 1925, onwards, at 2s. 6d. or 3s. per ton less than the prevailing price last June. Many companies had made forward contracts on those terms.

COUNSEL said that the reduction referred to did not affect every kind of coal. Referring to repairs and maintenance charges, he pointed out that in 1913 repairs cost 9·15d. per 1000 c.ft., or, with depreciation, 10·89d. In 1923, they cost 22·73d., and repairs and depreciation together amounted to 24·90d. Mr. Valon's estimate for repairs at present, however, was 16·52d., and, with depreciation, the figure amounted to 18·69d. Why was this so much below the figure of 1923?

Witness replied that the latter was the actual amount spent in 1923, whereas his figure of 18·69d. was the amount he considered the Company should spend at present, to compare with the figure of 10·89d. for 1913.

COUNSEL suggested that Mr. Valon had under-estimated the percentage in labour costs.

Witness replied that he had taken the actual wages paid in 1913, and the actual wages paid in 1923 (not the wage rates), and had made a reduction in respect of the excess repairs in 1923. When this was done, it would be found that the increase in cost of labour was less than the 93 p.ct. increase over 1913 which he had allowed. Therefore, he had adopted a figure which was in favour of the Company.

In the course of his re-examination Mr. Valon said that during 1924 there was a general drop in the price of coal, but he had taken the figures given him by the Company as the lowest prices at which they had made contracts. He did not agree that the price of tar depended upon the demand for road-making purposes. In the matter of repairs, the Company could determine the extent to which they would spend money on these; and if, as appeared to be the case, it was decided to do a very large amount of repairs in any one year, the full cost of this, as an annual expenditure for the future, should not be added to the general cost of production for the purpose of arriving at a new standard price. On the question of floating capital and the addition of the interest on it to working expenses, his view was that there should only be added to the cost of production interest in respect of the extra amount of working capital now necessary as compared with pre-war. This was the distinction between capital raised on debentures and money borrowed from the bank. In the former case obviously the interest could not be charged to working expenses, while in the latter only the proportion he had referred to should be so added.

THE CASE FOR THE GAS COMPANY.

Mr. TYLDESLEY JONES, addressing the Director on behalf of the Gas Company, said there would be agreement between the parties on many figures, because Mr. Valon, as usual, had put his case very fairly. Dealing with the important points of difference, however, Counsel first referred to the net cost of coal. The Company recognized the price obtained for coke was an important factor. There was no doubt that the export market which the London Gas Companies had for coke had gone. The price of coke, which was falling, did not affect the price of coal, but the price of coal affected the price of coke very considerably. In respect of tar, the price of which had fallen, there was a material difference between the two sides. Coming to repairs and maintenance, Counsel said the Company themselves had taken the average of three years; and on the whole there did not appear to be a large difference in the results arrived at by both sides. In principle they both agreed, but they differed in the percentage to be added.

He did not understand Mr. Valon's point relating to interest on debentures and mortgages. Apparently Mr. Valon was willing to allow interest on these, but would disallow any interest on moneys spent on extending works. The consumer was getting the benefit of the extended works; and it was difficult to see why money spent on retorts between 1913 and 1923 should be disallowed. As to the allegation that the Company's business was being worked at a lower efficiency in 1923 than in 1913, his witnesses would put figures before the Director which would show that Mr. Valon's calculations were quite wrong. The fuel had been measured, and the figures showed that the number of therms per ton of coal in 1923 was two more per ton than in 1913. The final figure which the Company claimed should be the new standard price was 14·57d. per therm, against Mr. Valon's 13·02d.

THE SECRETARY AND ACCOUNTANT GIVES EVIDENCE.

Mr. *E. J. K. Fussell*, Secretary and Accountant to the Company, first spoke as to the dividends paid by the Company, and then produced a series of tables, of which we reproduce the material ones, showing the manner in which the Company's estimate of the new standard price had been arrived at.

TABLE I.—*Statement of Costs of Production.*

Particulars.	Cost per 1000 C.Ft.							
	Year to Dec. 31, 1913.		Average Three Years, 1911 to 1913.		Actual, 1923 (1d. = £11,173).		A Standard Year.	
	d.	d.	d.	d.	d.	d.	d.	d.
Manufacture of Gas—								
1. Coal (*less* residuals)		4·28		3·61		6·85		11·53
2. Oil		1·59		1·61		2·80		3·66
3. Coke		1·11		1·09		1·25		1·26
Total		6·98		6·31		10·90		16·45
4. Salaries and wages (carbonizing)		1·72		1·67		4·00		4·13
5. Purification		·33		·34		·65		·65
6. Repairs, maintenance, and renewal of works		4·52		4·66		13·30		11·63
Total		13·55		12·98		28·85		32·86
Distribution of Gas—								
7. Salaries and wages		1·03		·99		1·55		1·53
8. Repairs and maintenance—								
(*a*) Mains and services	2·85		2·80		6·21		5·63	
(*b*) Meters	·55		·54		2·27		2·27	
(*c*) Stoves and fires	·67		·56		1·23		1·32	
(*d*) Coin fittings	·54		·69		·20		1·24	
9. *Add* depreciation—		4·61		4·59		9·91		10·46
(*a*) Meters	·92		·83		·73		·73	
(*b*) Stoves	·50		·48		·82		·82	
(*c*) Fittings	·16		21		·14		·14	
		1·58		1·52		1·69		1·69
Total		7·22		7·10		13·15		13·70
10. *Less* rentals—								
(*a*) Meters	1·91		1·95		1·90		1·90	
(*b*) Stoves	1·89		1·69		2·50		2·50	
(*c*) Coin fittings	2·01		1·99		4·85		4·85	
		cr. 5·81		cr. 5·63		cr. 9·25		cr. 9·25
Total		1·41		1·47		3·90		4·45
11. Rent, rates, and taxes (*Less* rents receivable)		1·54		1·39		2·55		3·03
Management—								
12. Office salaries and collectors		·59		·63		1·40		1·40
13. Directors		·31		·29		·35		·35
14. Stationery, printing, and general establishment charges		·51		·48		·60		·86
15. Superannuation, sick, and other funds		·16		·11		1·05		1·30
16. Co-partnership		·53		·52		·70		·70
17. Sundries		·17		·18		·15		·15
Total		2·27		2·21		4·25		4·76
18. Total expenditure on revenue account (including income-tax)		18·77		18·05		39·55		45·10
19. Interest on temporary loans (*Less* interest received)		·17		·21		·60		·60
20. Interest on mortgages and debentures		·74		·79		1·65		1·65
21. Sundry charges—raising capital						·10		
Total expenditure		19·68		19·05		41·90		47·35

After going through the various items detailed in Table 1, Mr. Fussell handed in Table 2, which shows the final estimation of the new standard price.

Mr. WROTTESLEY then cross-examined Mr. Fussell. His first point was that apparently the business of the Company was being carried on at a loss, as the costs of production were put at 9·39d. per therm, and the average selling price at 9·4d.

Witness said that during the latter part of 1914 the Company worked at a loss. The Directors had not yet considered the question of increasing the price, but it seemed to him that this prospect faced all the London Gas Companies, unless there was an improvement.

Questioned as to the price of coke, Mr. Fussell said that at present the Company were enjoying the benefit of some 1924 contracts at 27s. 6d. per ton, but it would not be fair for the new standard to be based on this, especially with the export market having practically gone. He would not agree that the end of the slump in tar had been reached.

Witness, in re-examination, said that the average price to the public of 9·4d. per therm was fixed in 1924, when there was a lower basis for arriving at that figure than was the case at the end of the year. If the Company's present estimate proved to be correct, then the price of gas must be increased.

VIEWS OF THE ENGINEER.

Mr. *H. C. Smith*, Engineer and Manager of the Company, dealing with the make of gas per ton, pointed out that in 1913 the amount of coal carbonized was 113,900 tons, and the therms per ton worked out to 67·7. In 1923 the therms per ton, on a larger

TABLE II.—*New Standard Price.*

	Pence per 1000 C.Ft.	Pence per Therm.
(1) Cost of manufacture and distribution, 1913	19·68	
Add adjustments for 3 years' average	0·21	
	19·89	
Less income-tax, 1913, £675	0·08	
	19·81 at 535 B.Th.U. ..	3·70
	Pence.	
(2) Estimated cost—standard year	47·35	
Less income-tax, £4593	0·41	
	46·94 at 500 B.Th.U. ..	9·39
		5·69
(3) Savings	0 40 at 500 B.Th.U. ..	0·08
		5·77
(4) Pre-war standard	44·00 at 500 B.Th.U. ..	8·80
(5) New standard claimed . .		14·57

	Pence per Therm.
Standard as at present	17·60
Standard as above	14·57
Reduction	3·03

amount of carbonized coal—namely, 166,617 tons—were 69·7. So that, although it had been suggested that the working of the undertaking was less efficient in 1923 than in 1913, the fact was that they were making 2 therms more per ton than in 1913. In 1923 they were fortunate in being able to make some favourable forward contracts, just before the occupation of the Ruhr, but those had now been worked out. The next batch of contracts was made in June and October, 1923, and subsequently other contracts were entered into in the early part of 1924. In December, 1924, the forward contracts were made which expired in June, 1926; but these were insufficient, to the extent of 30,000 or 40,000 tons, to meet the full requirements of the Company. As rebutting the evidence of Mr. Valon that coal prices had during the past twelve months or so fallen by 2s. or 3s. per ton, Mr. Smith said that the greatest reduction he was able to obtain was 1s. per ton, and that was on a 60,000-ton contract. The Company were perfectly free in their choice of coal, but were restricted to the extent that, with vertical retorts, South Yorkshire or Derbyshire coals were the most suitable. The average price of the contracts now running, including labour, was, he believed, about 31s. 10d. per ton. Dealing with coke, witness stated that the gross price of coke during 1924 was 38s. 4d., while the average price sold to the public during that year was 27s. 6d. net. Coke sold into wagons would be something over 5s. per ton less.

Witness, cross-examined by Mr. WROTTESLEY, said that great difficulty was now being experienced in selling coke.

Mr. WROTTESLEY asked for some details of the special repairs and maintenance which accounted for the high figure in this respect in 1923—namely, 13·30d. per 1000 c.ft.

Witness said that exceptional repair work was done in that year upon the sulphate plant and the tar plant, as well as renewals of retorts.

Replying to Mr. HONEY, Mr. Fussell gave the following figures of capital expenditure: 1921, £66,799; 1922, £52,810; 1923, £131,625. This expenditure, he said, was in respect of plant and buildings, a small amount for new mains and services, and a considerable sum for new meters, stoves, and fires.

Mr. WROTTESLEY, in his final remarks on behalf of the Council, said that, on Mr. Smith's evidence, something like £23,000 was exceptional expenditure on repairs and maintenance in 1923. This amounted to 2d. per 1000 c.ft., which was abnormal, and should not be taken into account. The large expenditure in 1923 upon maintenance and renewals of meters was being debited as to half to revenue and half to capital, so that here again the Company were endeavouring to get a benefit twice over, because they made the consumer pay part of the cost of the new meter, and at the same time took full benefit from the improved working. No claim ought to be made by the Company for repairs and maintenance of coin fittings, because this had practically disappeared. Whereas the costs of production were stated by the Company to be 9·39d., the average charge to the public was 9·4d. It appeared, therefore, that the business was being run as a philanthropic concern.

CAPITAL EXPENDITURE AS AFFECTING REVISION.

During the latter part of the proceedings, some discussion took place between Mr. Honey and Counsel on both sides—without special reference to the Tottenham case, but as a matter of general principle—as to the extent to which the advantages accruing from the expenditure of capital by a gas company should be allowed in arriving at new standard prices.

Mr. HONEY said he wanted to get some idea as to how far, in the case of a Revision Order, the question of capital came into consideration. In an original Order, supposing a company had spent capital a year or two before the war, and had improved their works, the improvement in working would have been reflected in the accounts by showing a comparatively small increase in cost over pre-war costs; and to this extent the company would lose the benefit of their previous capital expenditure. They would have taken away from them the remuneration which they would have expected to get by the working of the sliding-scale. For instance, if a company had a better carbonizing plant, which came into operation in 1914, and which reduced their working costs, they would get a lower standard price than if they had gone on working with their other plant. In other words, people who had been progressive would suffer. On the other hand, in the case of a Revision Order, the company were entitled to take into account any improvement within their control, and to that extent the Board of Trade were bound to take into account, to some extent, capital expenditure which had resulted in indirect savings. He gathered that the case of the Middlesex County Council was that, if the Company were to get any benefit from the improved results from new capital expenditure, it should be reflected in a lower standard price, so that in effect the benefit was being taken away from the Company.

Mr. WROTTESLEY said the position before the war was that the Company were entitled to the benefit of the expansion of business brought about by methods within their control; and he imagined that Parliament did not alter this principle under the Gas Regulation Act.

Mr. HONEY said it appeared they were in agreement that the intention was that, when making a Revision Order, nothing should be taken away from a company which they would get under the ordinary working of the sliding-scale.

Mr. WROTTESLEY agreed, but added that he would like Mr. Honey to consider the proposition that it was only by eliminating capital altogether that the exact cost of production could be arrived at; otherwise the position might be that two companies got totally different figures for producing the same quantity of gas, because in a particular year one of the companies indulged in a very large capital expenditure. Then if there was some saving due to expansion of business, unless there was some exception which took it outside the Act of Parliament, by all means give the advantage to the company.

Mr. JACQUES ABADY, who also made some remarks on the subject, with the object of assisting the Director generally, said it seemed to him to create an artificial position to exclude capital from consideration, because it would be necessary then, in considering the working of the undertaking, to stereotype the size of it for all time to the pre-war size. After all, capital had relation to the volume of business, to the costs of generation, and to the savings which the directors were entitled to retain. Once the Board of Trade moved away, as they must do in the course of time, from the same volume and output of business, then consideration must be given to the quantity of business done, which was fixed by the installation of new types of plant, which in turn could only be installed by the expenditure of new capital. It had always been the custom to make interest on borrowed capital part of the cost of running the business before appropriations were made for dividend; whereas, if the business was financed by share capital, then the directors were bound to look, for remuneration, to the increased net revenue brought about by the use of the capital.

INQUIRY AT HELSTON.

An inquiry was held at Helston last week by Mr. R. H. Hooper, of the Ministry of Health, into the application of the Town Council to borrow £3000 for extensions and renewals at the gas-works, which were recently acquired by the Corporation at a cost of £5000. The Deputy Town Clerk (Mr. J. P. Rogers) explained that, under a Special Order, the undertaking of the Helston Gas Company was transferred to the Helston Corporation on Jan. 15. The lease held by the Company would have expired in 1933. After the completion of the contract to sell, it was found necessary to provide a new exhauster at the works. There had been various leakages in the supply, the unaccounted-for gas for three years prior to 1924 being 27 p.ct. Directly the contract for the sale was signed, the Corporation instituted a search for the leakages, and £120 had been expended in this direction to the end of last November, with the result that for the quarter ended September last the unaccounted-for gas had been reduced to 18 p.ct. The mains in Lower Road and Meneage Street were very old, and required immediate renewal, at an estimated cost of £500. Mr. Hooper, in reply to Alderman H. Toy, said that the loan for the expenditure on mains and the holder would be repayable in thirty years, but the average period for the loan for the remainder of the proposed expenditure would be from ten to fifteen years. Mr. J. B. Martin (Chairman of the Gas Light Committee) said there was every evidence that the demand for gas in the town would increase; and he thought it would be advisable to include in the application £500 for prospective expenditure on new mains. Mr. Hooper observed that, including this sum, the total amount he was prepared to approve was £3350. He could not allow an item of £120 expenditure in searching for leakages, which was purely a revenue charge.

Dempster-Toogood Verticals for Hebden Bridge.—The Hebden Bridge and Mytholmroyd Gas Board have obtained sanction from the Minister of Health to borrow £9600 for the provision of a coal plant and a vertical retort bench at the works. Contracts for the work have been let to Messrs. Robert Dempster & Sons, Ltd., of Elland.

Grading of Brighouse Gas-Workers.—Strike trouble has been threatened at Brighouse consequent upon the alleged refusal of the Corporation to accede to a request of the Union that the men at the gas-works should be re-graded and placed on a higher grade than that settled by the Yorkshire (West Riding) Regional Gas Industrial Council. Certain gas-works in neighbouring districts are on the higher grade; but the contention of the Corporation is that Brighouse has been placed in a certain grade, and it is for the Industrial Council to do any re-grading that may be necessary. They are not so much concerned with the amount of the actual increase demanded as with the attack on the principle of decision by the Joint Industrial Councils.

EAST GRINSTEAD GAS ORDER.

Road Improvements and Gas Mains.

Mr. H. C. HONEY (Director of Gas Administration) held an inquiry at the offices of the Board of Trade last Thursday into an application for a Special Order under section 10 of the Gas Regulation Act, by the East Grinstead Gas and Water Company. The Order itself merely seeks to extend the area of the Company for gas purposes into a small adjoining district, and to enable them to make contracts for bulk supplies; and to this, on preamble, there was no objection. There was, however, a long discussion arising out of opposition by the East Sussex County Council and the Surrey County Council, both of whom asked for special protection for their roads and bridges. Behind it all was the fear on the part of the County Councils as to the future position *qua* the removal of gas mains consequent upon the more or less wholesale widening of roads and bridges that is now going on throughout the country. This, of course, involves an important matter of principle affecting all public utility undertakings; and the very logical objection was taken by the East Grinstead Company to a fundamental matter of this kind being determined piecemeal in small Orders, such as this, instead of by general legislation. However, Mr. Honey heard the case more or less in its entirety. Certain interesting points were raised which are reported below.

The Company were represented by Mr. D. T. LIVESEY (the Engineer and Secretary), while Mr. W. H. HILLS (the Chairman) was also present. The East Sussex County Council were represented by Mr. H. J. T. M'ILVEEN (Clerk) and Mr. H. E. LUNN (Deputy Surveyor); and the Surrey County Council by Mr. W. SIDGWICK (Messrs. Rees and Frere, Parliamentary Agents) and Mr. W. P. ROBINSON (the County Surveyor).

Mr. LIVESEY, explaining the provisions of the Order, said the principal object was to make a small extension of the area. Close to the present limits of supply was a district about one square mile in area, to which the Company, during the war, carried a 4-in. main for giving a supply of gas to a large house then used for wounded soldiers. This was done by an agreement with the Godstone Company, who at that time, it was thought, had powers to give a supply there. Subsequently, when the Redhill Company acquired the Godstone Company, it was ascertained that the latter Company had no powers to supply in this little area. Now the East Grinstead Company and the Redhill Company had divided the area; the former Company asking for the northern part. There had been many applications from persons living in the district; but the 4-in. main, already laid, was ample to meet a large extension of the demand.

Coming to the appearance by the East Sussex County Council, who asked for protective clauses, Mr. LIVESEY submitted that they had no *locus standi*; and he explained the position in this way. In the first place, the main that had been laid did not affect the area of the East Sussex County Council so far as roads were concerned; and as regards the bridge which divided East Sussex from Surrey, the necessary permission had been obtained for laying the main. The East Sussex County Council were, therefore, merely trying, through the medium of this small Order, to get the thin end of the wedge in for the purpose of obtaining greater protection than they were entitled to. In 1910 the Company were in Parliament with a Water Bill, and then conceded to the East Sussex County Council clauses similar to those now being asked for by the Surrey County Council; but there were special circumstances which led the Company to do that rather than have a fight in Parliament.

Mr. M'ILVEEN, dealing with the question of *locus*, pointed out that Fell Bridge, over which the Company had laid their mains, was under the jurisdiction of both the East Sussex and the Surrey County Councils. As a matter of fact, the 4-in. main had been laid illegally—no doubt under a misapprehension on the part of the Company—because the consent of the East Sussex County Council had not been sought for doing it. The mere fact that a main had been laid in this way—though he did not suggest any wilful wrong on the part of the Company—could not be claimed as taking away the *locus* of the County Council to be heard now. The presence of the main might place unfair burdens upon the County Council unless they were protected.

Mr. LIVESEY said the road approaching the bridge, and the bridge itself, were kept in repair by the East Grinstead Urban District Council, whose consent had been obtained.

Mr. M'ILVEEN replied that the East Grinstead Council did this by arrangement with the East Sussex County Council, upon whom the actual responsibility rested.

Mr. HONEY remarked that the *locus* of the County Council was a little insecure; but he would hear them on merits.

Mr. M'ILVEEN said the important point at issue was that, so great a change having taken place in the conditions of the highways since the early days, a totally different set of conditions had to be faced. Many county roads were being rebuilt with concrete foundations, and widened at a cost of hundreds of thousands of pounds. If in the course of this reconstruction work the mains of a gas or other company had to be altered, then the gas company should pay for the cost of alteration and removal. The existing powers of the Company were obtained before the East Sussex County Council came into being. A second Act was secured in 1892, just as the County Council were settling-down after their formation in 1888; and in 1910 the Company obtained a Water Act, to which reference had already been made, and in which special protection was given to the County Council. Therefore, the County Council had had no opportunity to make representations with regard to the existing gas mains.

Mr. LIVESEY said the case for the East Sussex County Council was similar to that of the Surrey County Council—viz., that special protection for roads and bridges was asked for in addition to that given in the Gas-Works Clauses Act, 1847. He reminded the Director, however, that, while County Councils should be adequately protected, public utility companies must also be protected; and he contended that the clauses being asked for would place an onerous burden on the Gas Company in this instance. They were the clauses which had been disallowed by Parliament in many cases before. Moreover, he deprecated dealing with such an important matter as this in small Orders such as the one under consideration, and suggested that it should be left over for general legislation.

Mr. SIDGWICK, for the Surrey County Council, said that many of the clauses proposed could be agreed, while the others had been inserted in various Acts of Parliament.

Mr. LIVESEY appealed to his friends on the other side to drop the matter on this small Order, and wait for general legislation.

Mr. SIDGWICK stated that the present Order would affect 1¾ miles of main roads, and two bridges—the Fell Bridge and the Woodcock Bridge—and he could not help feeling that the smallness of the Order was immaterial to the main issue. He also mentioned that clauses similar to those now asked had been inserted in various Acts, and also in Orders made by Mr. Honey.

Mr. HONEY: They were agreed.

The only difference in principle between the clauses proposed by the East Sussex County Council and those proposed by the Surrey County Council is that the East Sussex Council seek to make the Gas Company pay for the removal of pipes in respect of both road and bridge alterations, whereas the Surrey County Council express themselves satisfied if they get this protection in respect of bridges only.

Mr. SIDGWICK, dealing with the principle of the proposed clauses, said he was prepared to admit that the cost of removing gas mains should fall upon the Gas Company in the case of bridges only. This was the principle of the argument in the Eastbourne case in 1909; and a settlement had been arrived at on these lines. In other cases clauses had been put upon gas companies by which they had to bear the cost of removal of mains in roads, as well as upon bridges. A case in point was the East Kent Gas Order. In one of the clauses proposed here, seven days' notice, instead of the usual three under the Gas-Works Clauses Act, was asked from the Gas Company of their intention to do any works, except in cases of emergency, while a month's notice, instead of three days, was asked in the case of bridges.

Mr. LIVESEY objected to the provision of a section which, in the case of the Surrey County Council, prevented the Company from opening more than 100 yards of road at a time, because in those cases where the County Council desired the Company to cover-up the pipe with 8 in. of material, and then to follow with their own workmen to do the final reinstating, it meant that the Company's men would have to wait for the Council's men to finish before they could open up another 100 yards. The whole thing was impracticable; and however necessary it might be to have such a provision in a busy town, it was unnecessary in country roads, and especially in such a district as that covered by the present Order.

Mr. ROBINSON said that this procedure was followed without difficulty in the case of the Surrey Water Company. On the general question of reinstatement, he added that in cases where a road had to be widened, the final surface was macadam or asphalte, and the Gas Company could not do this with their own men.

Mr. LIVESEY said that footpaths must be provided, and the gas mains could go there.

Mr. ROBINSON said that in cases where the mains were in the road, the County Council would agree to the Gas Company's filling in to the surface of the road; and then the County Council would remove so much of it as necessary in order to do the final work upon the road surface, and charge the Gas Company with the cost.

Mr. M'ILVEEN, addressing the Director on behalf of the East Sussex County Council, emphasized the point that, though the clauses which he proposed covered the same ground as those which were put forward by the Surrey County Council, there was the important difference that he desired that the Gas Company should pay for any removal of mains through the widening or improvement of both main roads and bridges.

Progress at Belfast.

The Belfast gas undertaking was singled out for very complimentary reference by the Lord Mayor (Sir William Turner) in his review of the city's municipal activities, following his installation for the third time as Chief Magistrate. The Gas Department, he said, was the oldest, and hitherto had been the most successful, of the many enterprises for which the Corporation were responsible. For the financial year ended March 31, 1924, there was a net profit of £48,385, notwithstanding the fact that they were still able to boast of supplying gas to consumers more cheaply than almost any other city in the United Kingdom. For this excellent result they were to a great extent indebted to the profits accruing from the chemical works, which amounted to £69,443, as compared with £45,666 in the previous year. Not only were the gas-works holding their own, but the demand for gas continued to increase. This success was largely attributable to the skill and energy of the management and the progressive spirit displayed by the Committee. Old machinery was scrapped as soon as it was evident that better plant for the purpose was available. One of the retort houses had been recently reconstructed, and the producing capacity had practically been doubled, while new purifiers and condensers were at work with satisfactory results.

Improved Gas Cookers.—This is the title of a Company lately registered, with a capital of £1000, to carry on the business of manufacturers of gas cookers.

Dartmouth Price Reduction.—The Dartmouth Gas Company are reducing, as from April 1, the price of gas to ordinary meter customers from 5s. 5d. to 5s. 1d. (less 2d. cash discount) per 1000 c.ft. When this reduction takes place, the price of gas in Dartmouth will be only 20·4 p.ct. above pre-war.

EARLY EXPERIMENTERS.

Historical Information Placed before the Newcomen Society.

Members of the Newcomen Society for the Study of Engineering and Technology, at their meeting last Wednesday in Prince Henry's Room, Fleet Street, had presented to them three papers of considerable historical value, and two of these dealt with the work of men in whom "JOURNAL" readers will be interested

GEORGE DIXON, of Cockfield.

On p. 250 of the "JOURNAL" for July 9 last there was published, under the heading of "A Gas Experiment in 1760," a copy of the original sketch of the apparatus which was employed by George Dixon in an early gas experiment. It had previously been mentioned that Mr. Waynman Dixon, of Great Ayton, had put forward the claim "that the credit for the invention of gas lighting belonged to George Dixon, of Cockfield (born 1731, died 1785), owner of many collieries in Durham County." This publication brought forth the following comment by the "Co-Partnership Journal" of the South Metropolitan Gas Company:

> Some interest attaches to the publication in the "GAS JOURNAL" for July 9 of a sketch of apparatus used by George Dixon, of Cockfield, for experiments on coal. About the year 1760 Dixon heated coal to ascertain the quantity of tar obtainable from it, and accidentally ignited the issuing gases and vapours, causing an explosion which wrecked the apparatus. We note the contribution to the early history of coal distillation, but we can assure those who claim Dixon as the inventor of gas lighting that the evidence in support of their claim is not of much importance. Dr. John Clayton, Rector of Crofton, had distilled coal and collected the gas at least three-quarters of a century before; Dr. Stephen Hales, Vicar of Teddington, had published a sketch of an apparatus for distilling coal in 1727; and in connection with the early experiments of Lord Dundonald there is evidence that the gas which issued from his tar apparatus was ignited and used to light the workmen at their duties. Murdoch's claim to the invention of gas lighting rests upon the fact that in 1782 he manufactured gas from coal, conveyed it through pipes, and applied it to the lighting of his house and offices at Redruth. Blowing a tar plant to pieces is not quite the same thing as inventing gas-lighting.
>
> We are not ignoring the statement of John Bailey in 1810 concerning Dixon's further experiments—the heating of coal in an old tea-kettle and "luting hemlock stems with clay to the spout." Such records are quite interesting; but Dr. Clayton had done much more than that in the preceding century.

Reference to George Dixon's activities was made by Mr. James Macfarlan (late of the Patent Office Library) in a paper entitled "George Dixon's Experiments in Lighting by Coal Gas." Dealing first of all with the rise of the coal tar trade in Great Britain, the author said it is claimed for George Dixon that in 1779 he began making coal tar for commercial purposes; but the only point about this is that he anticipated Lord Dundonald in the same field by two years. Dixon was obliged to give up the trade in 1783, owing to the cost of sending tar barrels to Sunderland for the shipbuilders; but John Bailey, his nephew, claims for him that "he had discovered the process for extracting tar from coal upwards of twenty years before he began to manufacture it for sale," which places him over twenty years prior to Dundonald, and leads us to the date when he began his attempts at lighting by coal gas. It may be mentioned that this species of tar has been found much more durable for ships' bottoms than that obtained from vegetable substances.

As to the experiments with coal gas, the author quoted the statement made by Dixon's nephew, John Bailey, of Chillingham, in his book, "A General View of Agriculture of the County of Durham," published in 1810. The main portions of this statement, as affecting the gas experiments, were published in the "JOURNAL" for Oct. 17, 1923. Bailey, who was born in 1751, was an eye-witness of the experiments; for he says:

> I remember being much amused, when a little boy, by his [Dixon] filling an old tea kettle half full of coals, and setting it on the fire, and luting hemlock stems with clay to the spout, and to this several others round the end and side of a room; after a certain time he put the flame of a candle to the end of the farthest pipe, and immediately a bright flame issued from it, where nothing was visible before. He then made a small hole with a pin through the clay that luted the pipes together, and applying the flame of a candle to each, there were as many flames as holes. He had only made the discovery a little before, and this was probably the third or fourth exhibition of illuminating rooms by gas light.
>
> This mode of lighting rooms was for a long time a favourite project with him, and he had thoughts of lighting his collieries with them, but was cured of it by the following experiment, at which I was present: Wanting to know the quantity of tar produced by a ton of coals, he erected a furnace with a large cast-iron boiler, in which the coals were put; to this were fixed two large cast-metal pump tubes; one of them was passed through water in order to condense the oil and tar, the end of this was filled by a wooden plug, with a small hole to let out the tar, &c. Towards the conclusion of the experiment, he placed the flame of a candle to this hole; the inflammable gas immediately burned with a large flame, to extinguish which he struck it with his hat; the flame was driven inwards, the gas in the inside of the apparatus took fire as quickly as gunpowder, and exploded with a report like a cannon, driving out the wooden plug to a great distance, and exhibiting a cylindrical body of flame of several yards length. The heavy cast-iron pumps were removed from their places. From this time he considered his project of lighting collieries or rooms with gas lights as very dangerous.

In the issue of the "JOURNAL" in which the statement above quoted from appeared, Mr. Charles Hunt, whose "History of the Introduction of Gas Lighting" is well known, said:

> There does not appear to be any inherent improbability in the statement that a Mr. Dixon experimented with coal gas in 1760, or about fifty years before Murdoch appeared on the scene. At that time the production of illuminating gas from coal was probably well known, especially by those who practised distillation of coal for the production of tar, among whom was Lord Dundonald; while Minckelers in 1784 published an account of his inquiries on the subject. It does not appear, however, that either Lord Dundonald or Minckelers attached any importance to the illuminating power of the gas produced from coal, any more than did Dixon, who seems to have regarded the use of it as very dangerous, and therefore did not pursue the subject.

Mr. Hunt concluded his remarks with the following quotation from his own book on the subject:

> It is, therefore, correct to say that he [Minckelers] carried the matter but little, if anything, further than where it had been left by previous experimenters, or by Clayton, about a hundred years before. Clayton tells us that he frequently lighted-up his gas for the amusement of his friends; and Minckelers appears to have done much the same thing. Neither is, however, entitled on that account to be regarded as the inventor of gas lighting. Who, then, was its inventor? Surely he who was the first to demonstrate its utility; the first to show how it could be applied to the use and convenience of man. Such was not Minckelers, nor any of his fellow experimenters; such, however, was Murdoch.

JOHN PATISON, of Airdrie.

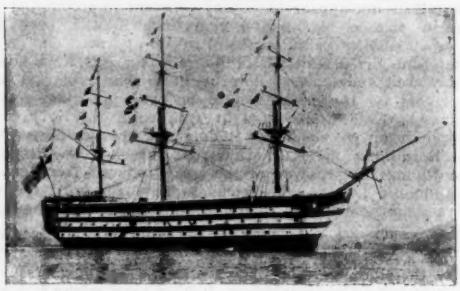
"Some Notes on a Neglected Worthy," by Mr. David Brownlie, B.Sc. (Hons.), Lond., F.C.S., gave interesting details of the life of John Patison, of Airdrie, who, he said, was one of the many original, and to-day unrecognized, workers who helped to build up the carbonization industries. His main achievements were the production of the first practical internal screw conveyor horizontal carbonization retort, and his labours in the evolution of the shale oil industry. In the work of collecting his large amount of information regarding Patison, the author acknowledged the assistance rendered by various persons—among them Mr. Archibald Kellock, Engineer and Manager of the Burgh of Airdrie Gas-Works.

John James Patison, to give him his full name, said Mr. Brownlie, was born in Leith in 1828, and ultimately lived in Airdrie, at Barblues Cottage, where he commenced experiments with the carbonization of shale. His first experiments were carried out by grinding the shale, putting it in the bowl of a common clay pipe, covering the charge with wet clay, and then heating the bowl in a fire—collecting the oil that came off from the end of the stem. Following upon these early experiments he started shortly afterwards a chemical works at Stand, near Airdrie, which was subsequently removed—either in 1856 or 1857—to Whiterigg, also near Airdrie, being known as the Whiterigg Chemical Works. The first process carried out was the distillation of shale refuse for the production of oil, and Patison was one of the earliest practical workers in the commercial development of the Scotch shale oil industry. It is known that shale, torbanite, cannel, and similar material, has, like coal, been carbonized from the earliest times. One of the practical pioncers of modern shale carbonization, and certainly the founder of the Scottish shale carbonization industries, was James Young, who took out in 1850 his patent which inaugurated the shale oil industry in Scotland. In partnership with Meldrum and Binney, Young set-up his first works at Bathgate the same year, and continued to use torbanite until 1862, when the supply failed. As a result, the much inferior shale had to be employed instead; and it has generally been understood that the first to do this on a large scale was Robert Bell, at the Broxburn Oil Works, in 1862. If, however, Patison carbonized true shale (say) somewhere about 1855 or 1856 at Stand or Whiterigg, of which there seems to be no doubt, he was long before Robert Bell, though James Young must have experimented in the laboratory with shale about 1850.

Both Young and Patison first used ordinary horizontal Ω-shaped retorts. Finally however, Young, in 1860, adopted a vertical, externally-heated, intermittent, tapering, cast-iron retort. Patison's first British patent for the internal screw conveyor retort was dated 1870. This was of horizontal cast-iron construction, externally heated, with a cast-iron screw conveyor, specially intended for the carbonization of spent dyewood residues and the manufacture of charcoal.

The design was of an extremely efficient and well-thought-out character for the purpose. It is not known when he first began to carbonize wood on a commercial scale, but apparently it was before 1870, and presumably he must have used at the commencement the ordinary intermittent type of closed retort, such as was then in vogue, subsequently inventing the much-improved and more complicated internal screw continuous installation. His second patent, dated 1873, is of more particular interest, because it related to an internal-screw externally-heated continuous retort intended for the carbonization, not only of wood and other similar material, but also of coal and shale or mixtures of these.

Screw conveyors were used at an earlier date for feeding coal into retorts, but they were not actually operating at high temperatures. As to the internal screw conveyor carbonization retort, the first definite use appears to Mr. Brownlie to be by Wilhelm Ziervogel, of Prussia (whose British patent was taken out in 1858), for use mainly in connection with the Saxon lignite carbonization industry, though intended also for shale. This was a vertical retort of very efficient design; the screw being intended to assist the downward travelling charge. There was a hollow perforated large-diameter screw shaft, to act as the discharge for the gaseous and volatile products evolved. In 1865, James Lougan used a horizontal screw conveyor retort with a hollow shaft through which heated gaseous products were passed; and in 1866 James Young devised a horizontal continuous

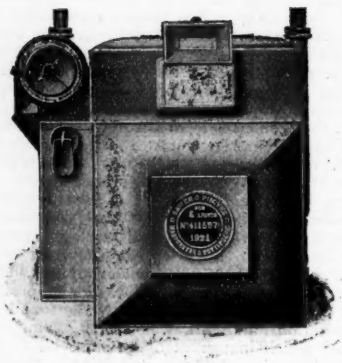


THE

OLD VICTORY,

AND THE

NEW—



BOTH SUPREME!

SAWER & PURVES,

MILES PLATTING, MANCHESTER.

RADFORD ROAD, NOTTINGHAM.

45-47 WESTMINSTER BRIDGE RD., LONDON, S.E.1.

retort for shale which acted on the same principle as a screw conveyor retort, except that the horizontal cylinder revolved bodily, and there was fixed inside a special steel blade or projection in a spiral form.

One of the chief difficulties with the internal screw conveyor retort for plastic and swelling material has always been the jamming of the screw by the charge; and it was claimed by the author that Patison was the first man to devise apparatus for overcoming this trouble. He said further; "It is very clear also that Patison intended to use this retort either for low-temperature carbonization, so as to give the maximum yield of liquid products, or at a much higher temperature, if illuminating gas was to be the chief requirement, with the liquid products of little importance. If this is the case as applied to coal, Patison was one of the earliest workers in low-temperature carbonization; but the facts are not clear, though there seems to be no doubt that many investigators from the very earliest times were well aware of the difference in the quality of the tar obtained according to the temperature of carbonization." An installation of twelve of these Patison retorts for shale continued in use for a number of years, but ultimately they were replaced by the Henderson vertical retort. While the screw conveyor retorts were economical in labour, wear and tear and consequent cost of maintenance proved a difficulty.

Another subject on which Patison appears to have carried out a large number of experiments is the distillation of tars mixed with common salt or potassium chloride. Patison in his private memoranda stated his conviction that "not only does salt added to tar improve the products, but potassium chloride gives much better results than common salt itself, the yield on fractionation giving different and superior oils."

All his life Patison remained keenly interested in the shale oil industry. He carried on the Whiterigg Chemical Works along with his son until 1886, when he retired from active business; and he died at Inverkeithing, in Fifeshire, in July, 1905.

TRADE NOTES.

Drakes' Specialities.

Messrs. Drakes Limited, of Halifax, have issued a folder containing literature dealing with the apparatus they manufacture. The well designed and brightly coloured lists form a pleasing contrast with manufacturer's catalogues of a few years ago.

Welsbach Showcards and Novelties.

The Welsbach Light Company, Ltd., have issued a set of new showcards and cut-out novelties for distribution to their customers during the present lighting season. The quality of production is very good. One of the novelties entitled "The Secret of a Lighthouse" is sure to attract much attention.

New Plant for Stoke-on-Trent.

The Stoke-on-Trent Gas Committee have recommended the acceptance of tenders from Messrs. W. C. Holmes & Co., of Huddersfield, for a sulphate of ammonia plant and a tar distillation plant, and from the Horseley Bridge Company, of Tipton, for steel storage tanks. The tender of Messrs. Geo. Waller & Son, Ltd., of Stroud, for a coke separating plant was accepted.

CONTRACTS OPEN.

New and Spent Oxide of Iron.

Tenders are invited by the Gas Committee of the Corporation of Darwen for the supply of new, and the purchase of spent, oxide of iron. (See advert. on p. 290.)

Supply and Repair of Gas Meters.

The Committee of the Manchester Corporation Gas Department are asking for tenders for the supply and repair of gas meters for a period of twelve months. (See advert. on p. 290.)

EXTENSIONS.

Extensions at Dewsbury.

The Ministry of Health have sanctioned the installation of new plant at the Dewsbury Corporation Gas-Works, at a total cost of about £30,000.

High-Pressure Main at Chorley.

At a recent meeting of the Chorley Gas Committee it was resolved that the Engineer's scheme for the provision of a 6-in. high-pressure main from the gas-works to Yarrow Road be carried out, provided that the Unemployment Grants Committee classify the scheme as unemployment relief works.

Goole's New Gas-Works Scheme.

The Goole Urban District Council have applied to the Ministry of Health for sanction to a loan of £31,500 in connection with their new gas-works scheme. In their application, the Council pointed out that the present gas-works plant is out of date and inadequate for the needs of the area. It is therefore intended to erect a new retort house, to put down four new beds of horizontal retorts, which will be charged and discharged by an electrically driven stoking machine, to instal a telpher for unloading coal from canal barges and loading coke for export, and also to provide four new purifiers. Space will be left for two additional beds of retorts, and under the scheme the capacity of the plant will be increased to three-quarters of a million c.ft. of gas a day.

Messrs. W. T. Bagshaw & Son, of Uttoxeter, recently offered for sale locally twenty £5 "A" shares in the Uttoxeter Gas-Works, Ltd. They were disposed of at £10 15s. per share.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

It becomes increasingly difficult to discover features of any interest to record in connection with the Newcastle market. There are still no signs of any change from the stagnation which has characterized it for months past. France, besides being fully supplied with reparation coal, appears to be continually increasing the output of her own mines, and exporters who specialize in the French markets report that prospects are by no means improving in that quarter.

The volume of trade seems somehow to be no smaller; some even think it is slightly better than it has been, judging by the working of the pits. But there is nothing like the demand necessary to ensure full normal working, and to improve prices to a level which would be reasonably payable and offer some prospects of a much-needed increase in wage rates.

Stocks on the Continent remain high, and buyers, when they need English coal, leave their inquiries until the last moment. Best sellers as a rule are maintaining recent prices, or else leaving the business alone, as they consider further reductions out of the question.

Gas coal makers can still generally see about a week or a fortnight ahead, and business continues to trickle in, without showing any expansion for forward periods. The uncertain labour outlook does not, of course, help matters.

Wear Specials maintain a nominal quotation of 22s. f.o.b., and best qualities 21s. 6d. A small contract for the latter class is reported for February-June shipment at 20s. f.o.b., so that nominal prices can be liberally discounted when definite business is offering. Other qualities are plentiful at 18s. to 18s. 3d.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

There is little change to record. The abnormally low rate of consumption of household coal accentuates irregular working at a good many pits. It has the further effect of keeping down the production of smalls and slacks, which are therefore relatively firm. Moreover, the requirements of electricity undertakings are on a considerable scale; the steady extension of facilities reinforcing the heavy seasonal demand. While there is no very great pressure for industrial fuel, demand is well sustained in this district, factory consumption going some way towards balancing the contracted volume of trade in the heavy industries of Staffordshire. These latter are so largely fueled from local sources of supply that fluctuating demand has no very widespread effect upon the market as a whole.

Blast furnace coke is in ample supply. The position in regard to values is not so strong as it was. Spot lots are to be picked up on special terms. Apart from this, there is no marked subsidence of prices. Pig iron is selling on such cramped lines that the prospect of more furnaces being relighted for the production of ordinary grades appears to be as remote as ever.

Gas coal has developed no new feature. Inquiries relate chiefly to future supplies, current consumption being well provided for. The transport system is working more satisfactorily, thanks to the open weather and the infrequency of rush orders.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

The gas coal market in Yorkshire and Lancashire continues easy, with consumers taking average contract quantities, although there is a little "spot" business at prices ruling below last year's quotations.

The continued mild weather still operates against the normal demand for house coal, and it does not appear that the next few months will compensate for the recent slowness of trade in this direction.

There is no improvement in the trade in industrial fuel in Yorkshire, although Lancashire reports more business, especially in the higher grades of slack. For the lower grade fuels non-contractors are better placed than those who have purchased ahead. For the better class coals there is apparently no surplus for disposal outside of contract.

The export market continues very weak, and seems likely to do so until the German competition and the high rates of exchange are dealt with by some concerted action in the first place on the part of the Government, and secondly by the producers and miners.

Prices at Hull at the week-end were: Bunkers—Yorks, Derby, and Notts large screened steam, f.o.b. Humber ports, 17s. 6d. to 19s. 6d. per ton. Cargo for export, f.o.b. usual shipping ports—Best Yorks hards, Association, 21s. 9d. to 22s.; Derby best hards, 21s. 9d. to 22s. 3d.; West Yorks Hartleys, 18s. to 22s.; South Yorks washed doubles, 21s. 6d. to 22s. 6d.; South Yorks washed singles, 21s. 6d. to 22s.; dry doubles, 15s. to 18s.; South Yorks washed smalls, 17s.; Derby slack, 1 inch, 11s. 9d. to 12s.; South Yorks rough slack, 12s. 3d.; gas coke, 21s. 6d. to 26s. 6d.; foundry furnace coke, 21s. 6d. to 22s.; washed smithy peas, 23s. 6d. to 25s.; washed steam thirds, 20s. 3d.; South Yorks washed trebles, 23s. per ton.

Explosion at Hackney.—On Jan. 30 a gas explosion occurred at No. 63, Gore Road, Hackney. It appears that Mr. and Mrs. E. Styles, who occupy a bedroom upstairs, were wakened about 6.30 a.m. by the screams of their ten-year-old niece. Entering the child's room, Mr. Styles struck a match as he opened the door, and an explosion immediately followed. The room caught fire, and spread to a bedroom occupied by Mr. Charles More, an octogenarian, who died from shock.

GAS REGULATION ACT, 1920.

BOYS' CALORIMETER

CALORIMETERS

PRESCRIBED BY

The Gas Referees

ARE

MANUFACTURED

:: PRINCIPALLY ::

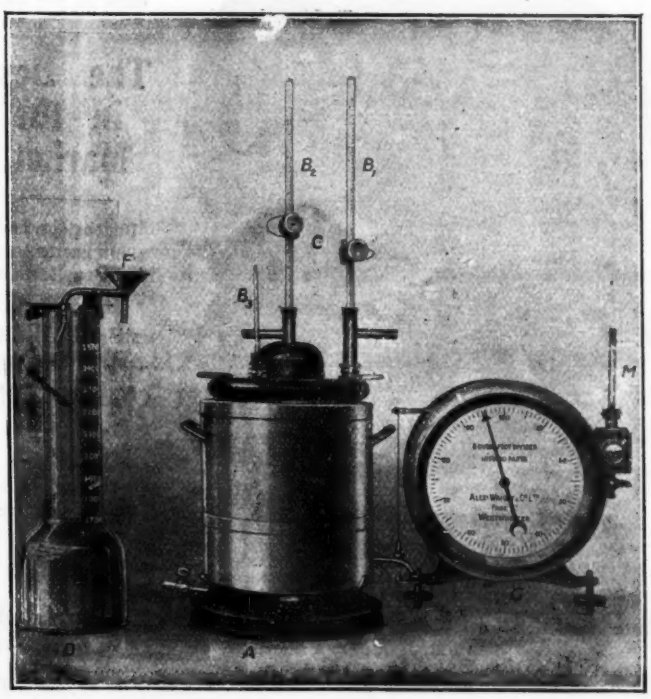
BY

ALEXANDER WRIGHT

& CO., LTD.,

1, WESTMINSTER PALACE GARDENS,

WESTMINSTER, S.W. 1.



CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, Feb. 2.

The London market for tar products is quiet.

There is an absence of inquiry for pitch, and the price is nominal at about 50s. per ton f.o.b. makers' works.

Creosote also is a little quieter, but firm at not below 7½d. per gallon net and naked at makers' works.

Pure benzole is in good demand at about 2s. per gallon. Pure toluole is about 1s. 10d. to 1s. 11d. per gallon; and solvent naphtha, 95-160, 1s. 8d. to 1s. 9d. per gallon.

Tar Products in the Provinces.

Feb. 2.

The markets for tar products, with the exception of creosote, are generally dull.

Creosote is steady without any alteration in price; but there is still a fair amount of demand for home and export.

Pitch is very quiet indeed, and although there does not appear to be any great pressure on the part of producers to sell, buyers are holding off.

Water-white products are in fair demand at unchanged prices.

Carbolic acid is quieter. The demand from the Continent appears to have ceased for the present.

Cresylic acid is still dull.

Naphthalene and anthracene are unchanged.

The average values for gas-works products during last week were: Gas-works coal tar, 32s. to 37s. Pitch, East Coast, 41s. 6d. to 44s. f.o.b. West Coast—Manchester, 38s. to 39s.; Liverpool, 39s. to 40s.; Clyde, 42s. to 43s. Benzole, 90 p.ct., North, 1s. 7½d. to 1s. 8½d.; crude, 65 p.ct. at 120° C., 9½d. to 10½d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 2d. to 1s. 3d. Toluole, naked, North, 1s. 7½d. to 1s. 8½d., nominal. Coal-tar crude naphtha, in bulk, North, 7½d. to 8d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 6d. Heavy naphtha, North, 1s. 1d. to 1s. 2d. Creosote, in bulk, North, liquid, 6¾d. to 7d.; salty, 6¾d. to 6⅝d.; Scotland, 6⅝d. to 6¾d. Heavy oils, in bulk, North, 6¾d. to 7d. Carbolic acid, 1s. 8d. to 1s. 9d. prompt. Napthalene, £12 to £14; salts, £4 to £5, bags included. Anthracene, "A" quality, 3d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Cheaper Gas at Cardiff.—As is rightly remarked by the "Co-Partners' Magazine" of the Cardiff Gas Light and Coke Company, the decision of the Directors of the Company to reduce further the price of gas from 9·3d. to 9d. per therm will be welcomed and appreciated by consumers.

Orders for three colliers with most modern equipment, for London Gas Companies, have been placed on the North-East Coast.

The Estimates Sub-Committee of the Bradford City Council have approved a recommendation of the Gas Committee to contribute approximately £325 towards the expense of the Gas Exhibit at Wembley this year.

The Exeter City Council are fitting the houses now being built under the Government scheme with a gas cooker, geyser, gas-heated wash boiler, and two gas fires. The housewife is insisting on these labour-saving appliances.

During 1924 there were 1431 new gas consumers added at Blackpool, this being greatly in advance of any progress previously recorded. The consumers now total about 21,500; 4000 having been added during four years.

At a meeting of the Birmingham Gas Committee on Monday last week, it was reported that the output of gas in the previous week was 324 million c.ft. This is a record, with the exception of one week during the war period—in January, 1918—when the output was 334 million c.ft.

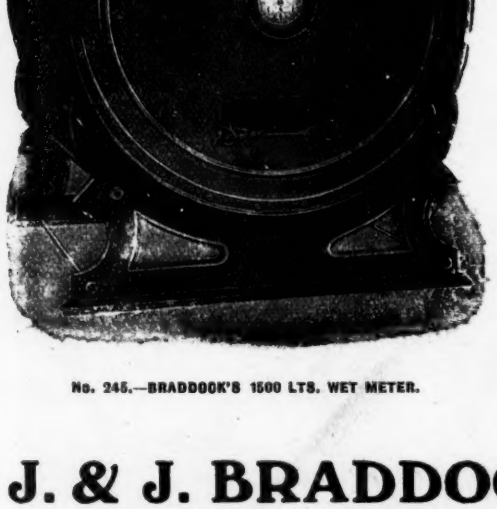
The Chesterfield Gas Committee have decided to ask the Staveley Coal and Iron Company for their observations on a recommendation of Mr. W. Doig Gibb as to the maximum price for coke oven gas from Staveley of 5d. per 1000 c.ft. if the Corporation lay the main, or 6¾d. per 1000 c.ft. if the Company do so.

The Directors of the Tottenham District Light, Heat, and Power Company recommend the payment of dividends in respect of the half-year ended Dec. 31, 1924, at the rates of 5 p.ct. per annum on the preference stock, 8 p.ct. per annum on the "A" stock, and 6½ p.ct. per annum on the "B" stock—all less income-tax.

The sale of 1s. tickets in connection with the interesting "Gas Output" Guessing Competition in Birmingham on behalf of the Lord Mayor's Unemployed Relief Fund is being stimulated by a model gasholder which has been placed in Victoria Square, and fitted with a number of booking office windows for the purpose of the issue and sale of tickets. The model, which has been made by the Birmingham Public Works Department, is constructed of a fibrous material, and is so devised that the upper portion of the structure is raised (as in a real holder) as the money flows in.

Messrs. John Terry & Co., of No. 7, Great Winchester Street, E.C., as agents, have received a cablegram from their principals, the Metropolitan Gas Company, of Melbourne, informing them that the profits for the six months to Dec. 31, 1924, were £138,600. A dividend of 7s. 6d., and on shares issued on Oct. 1 of 3s. 9d., per share has been declared; an amount of £56,700 has been transferred to reserve account; and a sum of £71,775 has been carried forward. Dividends were payable in Melbourne probably on the 2nd inst., and those to absentee shareholders will be posted by an early mail.

Braddock's Gas Station Meters



No. 245.—BRADDOCK'S 1500 LTS. WET METER.

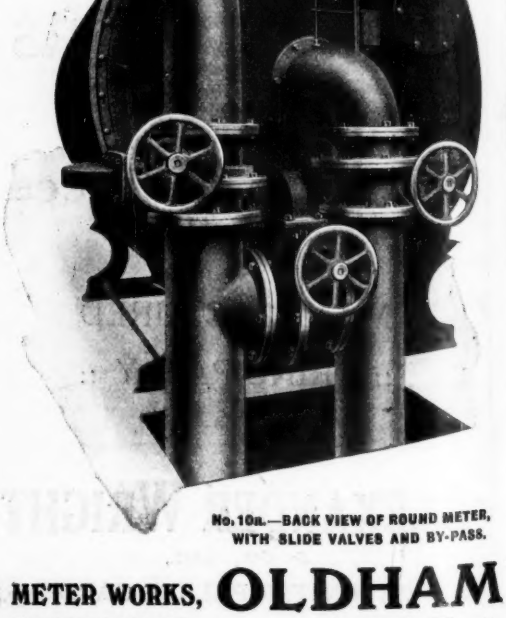
In Cylindrical Cases, for from 500 to 30,000 cubic ft. per hour.

The Best in the Market.

Dimensions and Full Particulars upon application.

OF SUPERIOR QUALITY AND CONSTRUCTION.

May be seen working up to full capacity before delivery.



No. 10a.—BACK VIEW OF ROUND METER, WITH SLIDE VALVES AND BY-PASS.

J. & J. BRADDOCK, GLOBE METER WORKS, **OLDHAM**

(BRANCH OF METERS LIMITED). Telegrams: "BRADDOCK OLDHAM." Telephone No. 215.

AND 45 & 47, Westminster Bridge Road, LONDON, S.E.

Telegrams: "METRIQUE LAMB LONDON." Telephone: No. 2412 HOP

STOCK MARKET REPORT.

QUIET conditions again prevailed on the Stock Exchange last week. The uncertainty of the foreign political situation, and a further growth in the labour unrest at home, undoubtedly influenced the position. In financial circles, the chief interest was centred in the speeches of the Chairmen of the "Big Five" banks, which in the main dealt with the prospect of a return to the gold standard. No outstanding utterance on the matter was remarked; and although the speeches generally indicated a prospect of a slight trade revival, conditions still appear to be in the balance. The cautiousness on the subject was doubtless due to the increasing signs of labour unrest, including rather extravagant demands for increased wages.

The gilt-edged market was neglected, which was in contradiction of the previous week's experience. Home Rails were fairly well supported. A little more prominence was given during the week to Foreign Bonds with compulsory drawings, some of which yield £7 p.c., without reckoning the value of the "drawings" prospect. The Industrial Market showed mixed results.

In the Gas Market there is, as usual, little to record, and the only material variations were in foreign company stocks. Imperial Continental advanced a further 3 points, and Montevideo 2 points; neither being due to dividend proximity. Two more dividend announcements were published—those of the two remaining Metropolitan Companies. The South Metropolitan are recommending a division of 3¼ p.ct. for the half-year, making 5½ p.ct. for the year, and the Commercial Company £5 14s. 8d. p.ct. per annum on the 4 p.ct. stock, and £5 13s. 4d. p.ct. per annum on the 3½ p.ct. stock for the half-year, making £5 17s. 4d. p.ct. and £5 16s. 8d. p.ct. respectively for the year, as compared with £6 p.ct. on both classes of stock for the previous year. The slight reduction in the case of the Commercial Company is due to the revision of their standard price.

The following transactions were recorded during the week:

On Monday, Bombay 5½, Bournemouth "B" £12 16s. 9d., 12¾, 13, Brentford 6 p.ct. Richmond debentures 103½, British 118, 118½, Cape Town 7½, Commercial 4 p.ct. 96½, 3½ p.ct. 91¼, Continental Union 41¼, Gas Light and Coke 97⅞, 98, 98¼, 98⅝, 98½, 3½ p.ct. maximum 65, 65¼, 4 p.ct. preference 81, Imperial Continental 180, 182, Primitiva 10s. 3d., 10s. 6d., 10s. 7½d., South Metropolitan 102½, 103, 103½, Wandsworth (Wimbledon) 118½.

On Tuesday, Brentford "A" 113½, Commercial 4 p.ct. 95⅝, 95⅞, 3½ p.ct. 95, 95¼, 95⅝, 96½, Continental Union 40, Gas Light and Coke 97⅛, 97⅞, 98¼, 98½, 3¼ p.ct. maximum 65½, 66, 4 p.ct. preference 80, 80¼, 80½, 81, 3 p.ct. debenture 60⅞, 61½, Imperial Continental 180½, 181½, Primitiva 10s. 3d., 10s. 5¼d., South Metropolitan 102½, Tottenham "B" 103, 4 p.ct. debenture 77, Uxbridge 5 p.ct. 106. Supplementary prices, Colonial 16s. 9d., 17s., 17s. 4½d., 17s. 6d., 7 p.ct. preference 16s. 3d., 16s. 6d., 17s. 7½d., Southend-on-Sea 5 p.ct. 87, 87½. Southgate 7 p.ct. maximum 104½, 105, Wandsworth 3½ p.ct. 102½.

On Wednesday, British 118, Commercial 3 p.ct. debenture 60, Continental Union 40½, European 8½ *ex* div., Gas Light and Coke 97½, 97⅝, 97⅞, 98, 98¼, 3½ p.ct. maximum 66, 4 p.ct. preference 80, 80¼, 81, 81½, 82, 3 p.ct. debenture 61½, Imperial Continental 183½, 184, Montevideo 63¼, Primitiva 10s. 1½d., 10s. 3d., South Metropolitan 102½, South Suburban 5 p.ct. 108½, 111, 5 p.ct. debenture 97, 97½, Southampton 84½, Tottenham "B" 103½, Wandsworth (Wimbledon) 119. Supplementary prices, Southend-on-Sea 4 p.ct. debenture 74, Tottenham 6 p.ct. regd. mts. 99½, 100.

On Thursday, Bournemouth 4 p.ct. debenture 77, 78, Continental Union 41½, 42, 7 p.ct. preference 91, European 8, 8¼ *ex* div., Gas Light and Coke 97½, 97⅞, 98, 98¼, 3½ p.ct. maximum 65¼, 3 p.ct. debenture 62, Imperial Continental 185, Primitiva 10s. 1½d., San Paulo 6 p.ct. preference 7⅞⅝, 7⅞⅞, Sheffield "C" 103, South Metropolitan 103½, 103¾, Tottenham "B" 103¾. Supplementary prices, Redhill 5½ p.ct. preference "A" 101½, Southend-on-Sea 5 p.ct. new "B" 92½, 93.

On Friday, Bombay 5½, Commercial 3 p.ct. debenture 60, Continental Union 7 p.ct. preference 91, European 8, 8⅜ *ex* div., Gas Light and Coke 97½, 98, 98¼, 4 p.ct. preference 80½, 81½, 82, 3 p.ct. debenture 60⅞, 61⅞, Imperial Continental 182½, 183½, 3½ p.ct. debenture 71, Primitiva 9s. 9d., 10s., South Metropolitan 103½, South Suburban 5 p.ct. 109½, Swansea 7 p.ct. preference 103½, Tuscan 25s., Wandsworth (Wimbledon) 119½.

Stringent conditions existed in Lombard Street at the end of the week, and the market had to seek assistance from the Bank of England. As much as 4½ p.ct. was paid for money over the week-end; and although an easier tendency prevailed at the close, 3½ p.ct. was the lowest rate reported. Treasury Bills were issued at an average rate of £3 14s. 2·76d. p.ct., or about 4d. p.ct. lower than the previous week.

Very little change took place in the Foreign Exchange Market. French and Belgian francs were slightly better at 88.35 and 92.20 respectively, while Italian lire improved to 114 11/16. Sterling on New York was exceedingly steady.

Bar Silver was ½d. higher for cash at 32½d. per oz.

The Bank rate is 4 p.ct., to which it was raised from 3 p.ct. on July 5, 1923. Bankers' deposit rates are 2 p.ct. The deposit rates of the discount houses are 2 p.ct. at call and 2½ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Jan. 30.	Rise + or Fall − on Week.	Transactions Lowest and Highest Prices.
£			% p.a.	% p.a.				
171,978	Stk.	Aug. 14	5	5	Aldershot 5 p.c. max. C.	80—83	..	..
235,492	,,	,,	4	4	Do. 4 p.c. Pref.	72—77	..	..
1,551,868	,,	Sept. 25	6	6½	Alliance & Dublin Ord.	64—69	..	..
374,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb.	61—66⅝	..	..
300,000	5	Oct. 23	8	8	Bombay, Ltd.	4—5½	..	5½
100,000	10	Aug. 14	8½	8½	Bournemouth 5 p.c.	12½—13½	..	..
425,050	10	,,	7	7	Do. B 7 p.c..	12½—13	..	{£12/16/0-£13/0/0
150,000	10	,,	6	6	Do. Pref. 6 p.c..	10½—11½	..	..
50,000	Stk.	Jan. 8	3	3	Do. 3 p.c. Deb..	56—59	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb..	76—79	..	77—78
992,045	,,	July 10	6 1/10	6 1/10	Brentford A Con.	112—117	..	113¾
990,500	,,	,,	6½	6½	Do. B New	112—117	..	..
76,000	,,	,,	5	5	Do. 5 p.c. Pref.	89—94	..	..
306,690	,,	Dec. 18	4	4	Do. 4 p.c. Deb.	75—80	..	..
131,337	,,	,,	—	6	Do. 6 p.c. Rich. Red. Deb.	100—105	..	103½
214,740	,,	Aug. 28	11½	11½	Brighton & Hove Orig.	170—175	..	..
244,200	,,	,,	8½	8½	Do. A Ord.	124—128	..	..
1,257,500	,,	July 24	5	5	Bristol 5 p.c. max..	95—96a	..	..
855,000	,,	Sept. 25	7	8	British Ord..	115—120	..	118—118½
100,000	,,	Dec. 18	7	7	Do. 7 p.c. Pref..	123—128	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	72—77	..	..
100,000	10	Dec. 18	8	6	Cape Town, Ltd.	6½—7½	..	7½
100,000	10	Nov. 6	4½	4½	Do. 4½ p.c. Pref..	6—7	..	—
150,000	Stk.	Dec. 18	4½	4½	Do. 4½ p.c. Deb..	71—76	..	..
626,860	,,	July 24	6	6	Cardiff Con. Ord.	97—100	..	..
237,860	,,	Jan. 8	7½	7½	Do. 7½ p.c. Red. Deb.	105—108	..	..
137,150	,,	Aug. 14	6½	5	Chester 5 p.c. Ord.	91—96b	..	..
1,513,280	,,	July 24	6	6	Commercial 4 p.c. Cap.	94—97	..	95½—96½
560,000	,,	,,	6	6	Do. 3½ p.c. Cap.	91—97	..	95—96½
475,000	,,	Dec. 18	3	3	Do. 3 p.c. Deb.	57—60	..	60
800,000	,,	14 Jan. 15	—	—	Continental Union, Ltd.	40—45	..	40—42
200,000	,,	Dec. 18	7	7	Do. 7 p.c. Pref.	88—92	..	91
660,000	,,	Aug. 28	6½	6½	Croydon sliding scale	102—105	..	..
284,975	,,	,,	5	5	Do. max. div.	84—87	..	..
492,270	,,	Aug. 28	9	6	Derby Con.	107—110c	..	..
55,000	,,	Jan. 8	4	4	Do. Deb.	74—76c	..	..
1,002,180	1	Jan. 22	6	4	European, Ltd.	8—9*	−⅛	8—8⅛
16,460,070	Stk	Aug. 14	5½	5½	Gas Light & Coke 4 p.c. Ord.	97—99	..	97½—95½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	63—66	..	65—66
4,062,235	,,	,,	4	4	Do. 4 p.c. Con. Pref.	80—82	+1	80—82
4,761,930	,,	Dec. 18	3	3	Do. 3 p.c. Con. Deb.	60—63	+1	60½—62
130,000	,,	—	10	10	Do. 10 p.c. Bonds	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Sept. 11	6½	6½	Hastings & St. L. 5 p.c. Conv.	95—100	..	..
238,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	75—80	..	..
70,000	10	Sept. 25	10	10	Hongkong & China, Ltd.	16—17	..	..
86,600	Stk.	Aug. 14	10	10	Hornsey 7 p.c.	138—143	..	..
1,976,000	,,	Nov. 20	30	10	Imperial Continental Cap.	180—185	+3	180—185
263,950	,,	Aug. 14	3½	3½	Do. 3½ p.c. Red. Deb.	70—73	..	71
235,242	,,	Aug. 11	6½	6½	Lea Bridge 5 p.c. Ord..	97—102	..	..
1,127,340	,,	Aug. 14	5½	5½	Liverpool 5 p.c. Ord.	93½—93½b	..	93 7/16
600,000	,,	Sept. 25	7	7	Do. 7 p.c. Red. Pref.	106—109b	..	..
165,736	,,	Aug. 28	8	9	Maidstone 5 p.c. Cap.	125—135	..	..
63,480	,,	Dec. 18	3	3	Do. 3 p.c. Deb..	54—5[illegible]	..	..
75,000	5	Dec. 4	7	5	Malta & Mediterranean	3½—3¾	..	..
541,920	Stk.	Nov. 20	4	4	Montevideo, Ltd.	62—67	+2	63½
1,475,892	,,	July 24	5½	5	Newcastle & Gateshead Con.	87½—88½d	+1	88
250,166	,,	,,	4	4	Do. 4 p.c. Pref..	74—75d	..	..
529,705	,,	Dec. 18	3½	3½	Do. 3½ p.c. Deb.	68—69d	..	..
15,000	10	Aug. 28	11	11	North Middlesex 10 p.c.	16—17	..	..
75,940	10	,,	7 7/10	7 7/10	Do. 7 p.c.	11½—11¾	..	..
300,000	Stk.	Dec. 4	7	9	Oriental, Ltd.	100—105	..	..
138,120	,,	Jan. 8	7⅛	7⅛	Plym'th & Ston'house 5 p.c.	109—114	..	..
60,000	50	Aug. 28	13	13	Portsea Island B	99—102	..	..
100,000	50	,,	12	12	Do. C	95—100	..	..
1,289,909	1	—	—	—	Primitiva Ord.	10/—11/-	..	9/9—10/7½
311,100	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb..	78—80	..	..
600,000	Stk.	Jan. 22	4	4	Do. 4 p.c. Red. Deb. 1911	63—65*	..	..
280,335	,,	Dec. 18	4	4	Do. B. Aires 4 p.c. Rd. Db.	65—67	..	..
321,670	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	65—67	..	..
150,000	10	Sept. 25	6	6	San Paulo 6 p.c. Pref.	7½—8	+½	7 7/32—7 9/32
125,000	50	Jan. 2	5	5	Do. 5 p.c. Red. Deb.	41—43	..	..
270,000	Stk.	Aug. 28	5/8/1/4	5½	Sheffield A	104—106e	..	..
419,968	,,	,,	5/8/1/4	5½	Do. B	104—106e	..	..
1,047,000	,,	,,	5/8/1/4	5½	Do. C	104—106e	..	103
90,000	10	Oct. 23	8	6	South African	7—9	..	..
6,609,895	Stk.	Aug 14	6½	5	South Met. Ord.	102½—104½	+1	102½—103½
1,895,445	,,	Jan. 8	3	3	Do. 3 p.c. Deb.	5[illegible]—62	..	..
734,000	,,	Sept. 11	6½	6½	Do. 6½ p.c. Red. Deb.	104—106	..	..
91,500	,,	Aug. 28	8½	8½	South Shields Con.	137—139d	..	..
1,087,795	,,	Aug. 14	6½	6½	South Suburban Ord. 5 p.c.	107—112	..	108½—111
368,837	,,	Dec. 18	5	5	Do. 5 p.c. Deb.	96—99	+1	97—97½
647,740	,,	Nov. 6	3	5	South'mpt'n Ord. 5 p.c. max.	83—86	..	84½
121,275	,,	Dec. 18	4	4	Do. 4 p.c. Deb.	72—77	..	..
250,000	,,	Aug. 28	7	7	Swansea 7 p.c. Red. Pref.	102—104	..	103½
200,000	,,	Dec. 18	6½	6½	Do. 6½ p.c. Red. Deb.	102—104	..	..
120,000	,,	July 24	8	8	Tottenham District A 5 p.c.	119—122	..	..
882,275	,,	,,	6½	6½	Do. B 3½ p.c.	102—105	..	103—103½
181,255	,,	Dec. 18	4	4	Do. 4 p.c. Deb.	75—79	..	77
258,251	,,	Aug. 28	7/14/4	5	Tynemouth Con. and New Uxbridge, Maidenhead, & Wycombe 5 p.c..	102—107	..	106
187,294	,,	Aug. 28	6½	6½	Do. 5 p.c. pref.	95—100	..	..
68,330	,,	Aug. 28	—	5	Do. 5 p.c. Maidenh'd	91—98	..	..
91,800	,,	—	—	—	Wandsworth, Wimbledon, and Epsom—			
30,000	,,	July 10	9½	9½	Wandsworth A 5 p.c.	140—145	..	..
255,636	,,	,,	7½	7½	Do. B 3½ p.c.	120—125	..	..
108,075	,,	,,	6/7/9	6/9/6	Do. C	102—107	..	..
240,865	,,	,,	6/7/9	6/9/6	New Ordinary	..	..	102½
352,000	,,	,,	7½	7½	Wimbledon 5 p.c.	116—121	..	118½—119½
98,000	,,	,,	7½	7½	Epsom 5 p.c..	122—127	..	..
28,416	,,	Dec. 18	3	3	3 p.c. Deb.	57—60	..	..

Quotations at:—*a.*—Bristol, *b.*—Liverpool, *c.*—Nottingham, *d.*—Newcastle, *e.*—Sheffield. * Ex. div.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON TUESDAY, to ensure insertion in the following day's issue.

Orders to Alter or Stop PERMANENT ADVERTISEMENTS should be received by the FIRST POST on Monday.

UNDISPLAYED ADVERTISEMENTS; Situations Wanted, Six Lines and under (about 36 words), 3s.; each additional Line, 6d. Situations Vacant, Apparatus Wanted and for Sale, Contracts, Public Notices, &c., 9d. per Line—minimum, 4s. 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

		ONE YEAR.	HALF-YEAR.	QUARTER.
United Kingdom & Ireland	Advance Rate:	35/-	18/-	10/-
	Credit Rate:	40/-	21/-	11/6
Dominions & Colonies & U.S.A. Payable in Advance		35/-	—	—
Other Countries in the Postal Union. Payable in Advance		40/-	22/6	12/6

In payment of subscriptions for "JOURNALS" sent abroad, Post Office Orders or Bankers' Drafts on London only are accepted.

All Communications, Remittances, &c., to be addressed to WALTER KING, LIMITED, 11, BOLT COURT, FLEET STREET, LONDON, E.C. 4.

Telegrams: "GASKING, FLEET LONDON." Telephone: Central 6055.

OXIDE OF IRON

FOR SALE OUTRIGHT, OR ON LOAN.

SPENT OXIDE

PURCHASED IN ANY DISTRICT.

GAS PURIFICATION & CHEMICAL CO., LTD.,
PALMERSTON HOUSE,
OLD BROAD STREET, LONDON, E.C.2.

"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for Gas-Works.
ANDREW STEPHENSON, Gresham House, Old Broad Street, LONDON, E.C. "Volcanism, London."

SULPHATE OF AMMONIA
SATURATORS and all LEAD and TIMBER WORK in connection with Sulphate Plants.
We Guarantee promptness with efficiency for Repairs.
JOSEPH TAYLOR (SATURATORS), LTD., Chemical Plant Engineers, Blackhorse Street Mills, BOLTON.
Telegrams—"SATURATORS, BOLTON." Telephone 848.

J. E. C. LORD (Manchester), Ltd.,
Ship Canal Tar Works, Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid, Carbolic Acid, &c.

MEWBURN, ELLIS, & CO.,
CHARTERED PATENT AGENTS AND
TRADE MARK AGENTS,
70 & 72, Chancery Lane, London, W.C. 2.
Telegrams: "Patent, London." Phone 243 Holborn.
And 3, St. Nicholas Buildings, Newcastle-on-Tyne.

GEORGE WILSON GAS METERS, Ltd.
for
GAS-METERS, ORDINARIES, SLOTS, AND REPAIRS.
Foleshill Road, COVENTRY.
Telephone: 596. Telegrams: "GASMETER,"
and at 268, Stockport Road, MANCHESTER.
Telephone: RUSHOLME 976. Telegrams: "GASMETER,"
and 46 & 47, Auckland Street, LONDON, S.E. 11.
Telephone: HOP 647. Telegrams: "GASEOUS LAMB."

SPENCER'S Patent Inclined HURDLE GRIDS.

THE very best Patent Grids for Holding Oxide Lightly.
See Illustrated Advertisement, Jan. 14, p. 100.

WEIGHBRIDGES

FOR Motor Lorries and Railway Traffic can be seen erected at our works READY FOR DELIVERY. Inspection by your Engineer invited and a test by your Local Inspector of Weights and Measures before delivery. Every machine a High-Class Engineering Product and fully guaranteed.
CHARLES ROSS, LIMITED,
SHEFFIELD.

SULPHURIC ACID.

SPECIALLY prepared for the manufacture of SULPHATE OF AMMONIA.
SPENCER CHAPMAN & MESSEL, LTD.,
with which is amalgamated WM. PEARCE & SONS, LTD., 36, Mark Lane, LONDON, E.C. Works—SILVERTOWN.
Telegrams—"HYDROCHLORIC, FEN, LONDON."
Telephone—ROYAL 1166.

PATENTS and Trademarks. Inventors' Advice, Handbook and Cons. free. B. T. KING (Regd. Patent Agent, G.B., Canada and U.S.A.), 146A, QUEEN VICTORIA STREET, LONDON. 38 years' refs. 'Phone 682 Cent.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, LONDON, S.E. 1.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 815, Oldham, and 2412 Hop, London.
Telegrams—
"BRADDOCK, OLDHAM," and "METRIQUE, LAMB, LONDON."

THE BRITISH GAS PURIFYING MATERIALS CO., LTD.,
99, LONDON ROAD, LEICESTER.
Solicit enquiries for:—
NATURAL BRITISH PURIFYING MATERIAL,
NATURAL HYDRATED OXIDE OF IRON,
BEST QUALITY DUTCH BOG ORE,
BEST QUALITY BELGIAN BOG ORE,
"PREPARED" AND "UNPREPARED" ARTIFICIAL OXIDES.
SPENT OXIDE PURCHASED.
Telegrams "BRIPURMAT, LEICESTER." Telephone: LEICESTER 5096.

WE Specialize in Small Gas-Works and Solicit Inquiries for COMPLETE WORKS EXTENSIONS, and RENEWALS.
Penney & Porter (Engineers), Ltd.,
LINCOLN.
Established 1855.
Telegrams: Porter, Lincoln. Telephones: 266 & 211.

WET & DRY GAS METERS.
ORDINARY & PREPAYMENT.
IN TINPLATE OR CAST-IRON CASES.
TRY OUR CAST-IRON DRY.
Alder & Mackay, Ltd.,
NEW GRANGE WORKS,
EDINBURGH.
LONDON, BRADFORD, AND BELFAST.

APPOINTMENTS, &c., VACANT.

EDINBURGH CORPORATION.
(GAS DEPARTMENT.)

SALES SUPERINTENDENT.

SMART, Well-Educated Young Man, with Business, Commercial, and Practical Training, wanted to act as SALES SUPERINTENDENT and Develop the Use of Gas in every way under the Control of the Engineer and Manager.

Applicants must be thoroughly Experienced in up-to-date Advertising, Publicity Methods, and Salesmanship, able to give Lectures and Demonstrations on Gas Appliances and their uses.

Age not to exceed 40.

Salary, £375 per Annum (no bonus being payable).

Applications, stating Age, Present Employment, Experience and Training, along with Testimonials, must be forwarded to the undersigned on or before Saturday, the 28th of February, 1925.

Canvassing directly or indirectly will be held to be a Disqualification.

A. GRIERSON, S.C.C.,
Town Clerk.

City Chambers,
Edinburgh.

PADIHAM GAS DEPARTMENT.

WANTED—thoroughly Competent FOREMAN for the Gas-Works. Must have had Experience with Horizontal Retorts, with Stoking Machine.

Applicants must state Age and Wages required, also give Full Particulars of Training and Experience. House provided.

Apply, by letter, to the MANAGER, GAS-WORKS, PADIHAM.

OXIDE OF IRON.
SPENT OXIDE BOUGHT.
BALE & CHURCH, LTD.,
33, ST. MARY AT HILL, LONDON, E.C.3.
Phone: Royal 1484.

"TORTO" FIRE CEMENT.
BALE & CHURCH, LTD.,
33, ST. MARY AT HILL, LONDON, E.C.3.
Phone: Royal 1484.

"KLEENOFF," THE COOKER CLEANSER.
Tins for Sale to Consumers.
In Bulk for Works Use.
(*See "The Gas Salesman," p. 24*)
BALE & CHURCH, LTD.,
33, ST. MARY AT HILL, LONDON, E.C.3.
Phone: Royal 1484.

ALDERSHOT GAS, WATER, AND DISTRICT LIGHTING COMPANY.

WANTED—Assistant Outdoor Manager. Must be First-Class Distribution Engineer, Experienced in Gas and Water, and the Whole of the Work in that Department, from the Preparation of the Plans to the Costing and Completion of the Work. Must also be capable of Supervising Groups of Districts in regard to Fitting Work in all its Branches, and able, if required, to give Technical Advice on Special Work, outside of the purview of the Sales Department.

Applications, in own handwriting (endorsed "Application for Assistant Outdoor Manager"), accompanied by *copies* of Three recent Testimonials, giving Full Particulars of Experience, &c., Age, Salary required, addressed to the Gas and Water Engineer, Mr. A. V. Barraclough, not later than first post, Feb. 12, 1925.

By order,
F. A. RICKETTS,
Secretary.

Chief Office,
Victoria Road, Aldershot.

PLANT, &c., FOR SALE & WANTED.

GAS PLANT IN STOCK.

PURIFIERS.—Dry lutes, 10 ft. sq. and 10 ft. by 8 ft. Also 8 ft. sq. and 10 ft. by 8½ ft.
Condensers.—6 in. and 8 in. Vertical Pipe Condensers. Also Patent Baffle Plate Condensers.
Livesey Washer.—8 in. Connections.
Tower Scrubbers.—5 by 30, 4½ by 36, 4½ by 18, 4 by 12, 3 by 12.
Exhausters.—2000 to 50,000 c.ft. per hour cap.
Station Meters.—4 in., 6 in. and 8 in. Connections. Also 100 lt. and 200 lt.
Station Governors.—4 in., 5 in. and 6 in. Recently overhauled. Cheap for quick sale.
Gasholder and Steel Tank.—10,000 capacity.
Also in stock PUMPS, TANKS, VALVES, CAST-IRON PIPES, TUBING, &c.
Send us your inquiries.
Firth Blakeley, Sons, & Co., Ltd.,
CHURCH-FENTON, *via* LEEDS.

COUNTY BOROUGH OF BIRKENHEAD.
(GAS DEPARTMENT.)

TENDERS are invited for Obsolete and DISUSED PLANT at the Gas-Works, Thomas Street, Birkenhead.

The plant offered includes CONDENSERS, TAR SCRUBBERS, WASHERS, VALVES, SPECIALS, &c.

Full details may be obtained, and the Plant inspected, on Application to the Gas Engineer, Gas-Works, Thomas Street, Birkenhead.

Tenders to be sent in to me by March 1, 1925.

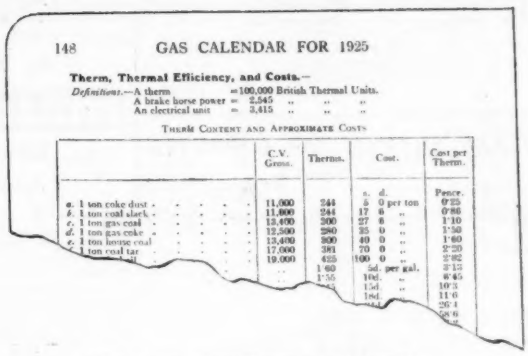
E. W. TAME,
Town Clerk.

Town Hall,
Birkenhead.
Jan. 26, 1925.

FOR SALE.—Large Quantity of 16 in. Circular MOUTHPIECES, with Eccentric Levers, Suitable for Beds of Eight, 6 in. Diameter ASCENSION PIPES. Bridge Pipes and Hydraulic Mains. One 10-in. GOVERNOR, with Inlet, Outlet, and By-Pass Valve. Low Prices to clear.
Can be Inspected on Application to the RESIDENT ENGINEER, GAS-WORKS, MARINE PARADE, SOUTHAMPTON.

Some Recent "JOURNAL" PUBLICATIONS

The "JOURNAL" DIARY AND GAS CALENDAR.



148 GAS CALENDAR FOR 1925

Therm, Thermal Efficiency, and Costs.—

Definitions.—A therm = 100,000 British Thermal Units.
A brake horse power = 2,545 " "
An electrical unit = 3,415 " "

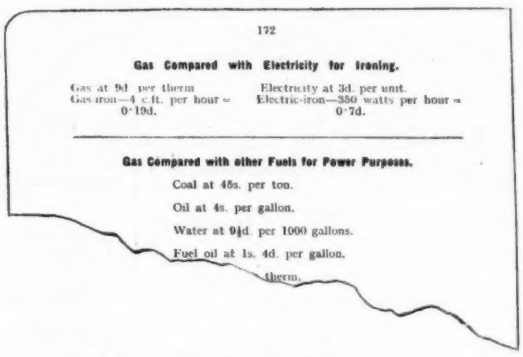
THERM CONTENT AND APPROXIMATE COSTS

	C.V. Gross.	Therms.	Cost.	Cost per Therm.
			s. d.	Pence.
a. 1 ton coke dust	11,000	244	5 0 per ton	0·25
b. 1 ton coal slack	11,000	244	17 6 "	0·86
c. 1 ton gas coal	12,400	500	27 6 "	1·10
d. 1 ton gas coke	12,500	280	35 0 "	1·50
e. 1 ton house coal	13,400	300	40 0 "	1·60
1 ton coal tar	17,000	381	70 0 "	2·20
1 ton oil	19,000	425	100 0 "	2·82
	..	1·60	5d. per gal.	3·15
		1·35	10d. "	6·45
			15d. "	10·3
			18d. "	11·6
				26·4
				28·6

Limp Cover, rounded corners, gilt lettered.

Size: 7" × 4¾" :: Price: **7/6** post free.

The GAS SALESMAN'S DIARY & HANDBOOK.



172

Gas Compared with Electricity for Ironing.

Gas at 9d. per therm — Electricity at 3d. per unit.
Gas iron—4 c.ft. per hour = 0·19d. — Electric-iron—330 watts per hour = 0·7d.

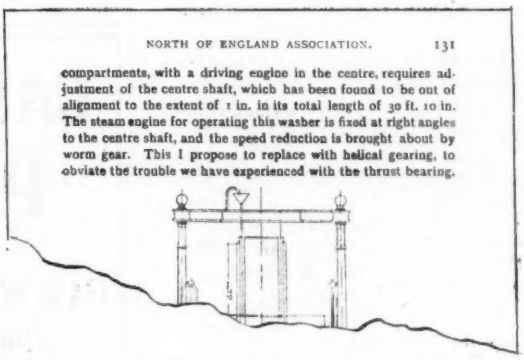
Gas Compared with other Fuels for Power Purposes.

Coal at 45s. per ton.
Oil at 4s. per gallon.
Water at 9½d. per 1000 gallons.
Fuel oil at 1s. 4d. per gallon.
1therm.

Limp Cover, rounded corners, gilt lettered.

Size: 8" × 5¼" :: Price: **3/6** post free.

Transactions ASSOCIATIONS of GAS ENGINEERS and MANAGERS.



NORTH OF ENGLAND ASSOCIATION. 131

compartments, with a driving engine in the centre, requires adjustment of the centre shaft, which has been found to be out of alignment to the extent of 1 in. in its total length of 30 ft. 10 in. The steam engine for operating this washer is fixed at right angles to the centre shaft, and the speed reduction is brought about by worm gear. This I propose to replace with helical gearing, to obviate the trouble we have experienced with the thrust bearing.

This volume is uniform with the old series.

Size: 8¾" × 6⅛" :: Price: **10/6** post free.

WALTER KING, Ltd., "GAS JOURNAL" Offices, 11, Bolt Court, Fleet St., London, E.C.4.

ROBERT DEMPSTER & SONS, Ltd., ELLAND, Builders of CARBONIZING PLANTS, both Horizontal and Vertical. Manufacturers of CONDENSERS, PURIFIERS, GASHOLDERS, &c., also every description of COAL and COKE HANDLING PLANT. Telegrams: "DEMPSTER, ELLAND." Telephone: ELLAND 261 (Private Branch Exchange).

EXTENSIONS and Renewals. Ask us to quote before ordering GAS APPARATUS, COKE-OVEN PLANT, STRUCTURAL STEEL-WORK. Competitive prices, First-Class Workmanship. Satisfaction Guaranteed.
FIRTH BLAKELEY, SONS, & Co., LTD., CHURCH FENTON, YORKSHIRE.

PLANT, &c., FOR SALE & WANTED

(Continued.)

STEAM-BOILERS For Sale—All Sizes, Vertical. Loco-type, Cornish, Portable, and Other Types of Boilers.
Apply
GRANTHAM BOILER & CRANK CO., LTD., GRANTHAM.

FOR SALE — 10,000 feet of 8-in. WELDLESS STEEL SPIGOT and SOCKET PIPING. Lengths 16-18 Feet, Never Laid, Coated, immediate Delivery. Also 3500 feet of 8-in. ditto, Coated and Wrapped. Suitable for Main. Low Price to clear
GEORGE COHEN, SONS, & Co., LTD, 600, COMMERCIAL ROAD, LONDON, E 14.

CONTRACTS OPEN.

BOROUGH OF DARWEN.

TENDER FOR THE SUPPLY OF OXIDE OF IRON.

THE Gas Committee of the above Corporation are prepared to receive TENDERS for the Supply of 250 Tons of OXIDE of IRON, Delivered at their Siding, for Gas Purification purposes at their Works.

All Particulars may be obtained from Mr. A. H. Smith, Gas Engineer, to whom all Samples are to be sent.

Sealed Tenders, endorsed "Oxide," to be Delivered to the undersigned not later than Saturday, the 21st of February, 1925.

The lowest or any Tender will not necessarily be accepted.

By order,
HARRY ROTHWELL,
Town Clerk.

Town Clerk's Office,
Jan. 29, 1925.

BOROUGH OF DARWEN.

SPENT OXIDE.

THE Gas Committee of the above Corporation invite TENDERS for the Purchase of about 500 to 600 Tons of SPENT OXIDE.

All Particulars and Samples may be obtained on Application to Mr. A. H. Smith, Gas Engineer.

Sealed Tenders, endorsed "Spent Oxide," to be Delivered to the undersigned not later than Saturday, the 21st of February, 1925.

The highest or any Tender will not necessarily be accepted.

By order,
HARRY ROTHWELL,
Town Clerk.

Town Clerk's Office,
Jan. 29, 1925.

MANCHESTER CORPORATION.

(GAS DEPARTMENT.)

TO MANUFACTURERS OF GAS-METERS.

THE Committee are prepared to receive TENDERS for the SUPPLY and REPAIR of GAS-METERS (Ordinary and Automatic) during a period of Twelve Months commencing April 1 1925.

Particulars and Forms of Tender may be obtained on Application (in writing only) to Mr. J. H. Sillitoe, Secretary, Gas Department, Town Hall, Manchester.

Sealed Tenders, addressed to the Chairman of the Gas Committee, and endorsed "Tenders for Gas-Meters," must be Delivered at the offices of the Gas Department, Town Hall, Manchester, not later than Thursday, the 19th of February, 1925.

The Committee do not bind themselves to accept the lowest or any Tender.

By order,
P. M. HEATH,
Town Clerk.

Town Hall, Manchester,
January, 1925.

WILLIAM PERCH, LTD.,
CARDIFF,
Colliery Proprietors, Coke Manufacturers,
GAS COAL SPECIALISTS.

Telegrams: "PERCH, CARDIFF." Telephones: Nat. No. 2543. (Private Branch Exchange)

GAS METERS
Their Construction, Use, Fixing, Inspection, and Maintenance.
A Handbook for Engineers and Managers, Inspectors, Fitters, and Students.
By A. T. GILBERT,
Late of the Distribution Staff of the South Metropolitan Gas Company and Distribution Superintendent to the Nuneaton Gas Company.
Price **7/6** plus postage, 6d.
WALTER KING, Ltd., "GAS JOURNAL" Offices, 11, Bolt Court, Fleet Street, E.C. 4.

COMPANY NOTICES.

HORNSEY GAS COMPANY.

NOTICE is Hereby Given that the ANNUAL ORDINARY GENERAL MEETING of the Proprietors of this Company will be held at No. 5, Great Winchester Street, in the County of London, on Friday, the 20th day of February, 1925, at 11.30 o'clock in the forenoon precisely, to receive the Report of the Directors and the Accounts for the Year ended 31st December last; to declare Dividends; elect two Directors and an Auditor; and to transact the Business of an Ordinary General Meeting.

The TRANSFER BOOKS WILL BE CLOSED from the 6th to the 20th of February, 1925, both days inclusive.

By order of the Board,
WILLIAM E. ROBERTS,
Secretary.

Secretary's Office,
Gas-Works, Clarendon Road,
Hornsey, N. 8,
Feb. 2, 1925.

SOUTH STAFFORDSHIRE MOND GAS COMPANY.

NOTICE is Hereby Given that the TWENTY-FOURTH ORDINARY MEETING of the Shareholders of the above Company will be held at the Works of the Company, Dudley Port, Tipton, on Tuesday, the 24th day of February, 1925, at 2.45 p.m. for the purpose of:

Receiving the Statement of Accounts and the Reports of the Directors and Auditors; Declaring a Dividend on the Preference Shares; Electing Directors; Fixing the remuneration of Auditors for the past year; Electing Auditors; Transacting such other Business as it is competent for an Ordinary Meeting to transact.

The TRANSFER BOOKS WILL BE CLOSED from the 11th inst. to the 24th inst., both days inclusive.

By Order of the Board,
WILLIAM H. CARDER,
Secretary.

Dudley Port,
Tipton,
Feb. 2, 1925.

BARNET DISTRICT GAS AND WATER COMPANY.

NOTICE is Hereby Given that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of the above Company will be held at the Offices of the Company, No. 139, Cannon Street, London, E.C., on Monday, the 23rd day of February, 1925, at Half past Twelve o'clock precisely, to receive the Report of the Directors and the Accounts for the Half-Year ended the 31st of December last; to declare a dividend; to elect Directors and an Auditor in the place of those retiring by rotation; and to transact the General Business of the Company.

The TRANSFER BOOKS WILL BE CLOSED from the 10th to the 23rd of February, both inclusive.

By order of the Board,
E. D. DAVEY,
Secretary.

Offices:
139, Cannon Street, London,
Feb. 9, 1925.

CAST IRON PIPES
FOR
GAS, WATER, & STEAM
1½in. to 12in. BORE.
THOS. ALLAN & SONS, LTD.,
Bonlea Foundry,
THORNABY-ON-TEES.
Telegrams: "BONLEA, THORNABY-ON-TEES."

JOHN HALL & CO. LIMITED, STOURBRIDGE
STOURBRIDGE,
Manufacturers of
FIRE-BRICKS, LUMPS, TILES,
GAS RETORTS,
And every description of Fire-Clay Goods
RETORTS CAREFULLY PACKED FOR SHIPMENT.

"BRISTOL'S"
(REGISTERED TRADE MARK)
The largest makers in the world of - -
Recording Instruments for Pressure, Temperature, Electricity, &c.
The choice of 2,500 different charts and experience in making 150,000 Instruments costs you nothing.
J. W. & C. J. PHILLIPS, LTD.,
23, College Hill, Cannon St., London, E.C. 4.

W. SPENCER & SONS
SOUTHALL, MIDDX.
Sole Patentees and Manufacturers of
SPENCERS' PATENT
SIMPLEX & CLIMAX GRIDS.
INSTALL A TRIAL SET FOR COMPARISON WITH OTHER GRIDS.

KOPPERS' CHAMBER OVENS.
KOPPERS' VERTICAL OVENS.
KOPPERS' REVERSIBLE REGENERATIVE RETORT SETTINGS.
See large Advert. appearing in alternate issues of the "Journal."
For full particulars of the above systems apply to
KOPPERS' COKE OVEN CO., LTD.,
301, Glossop Road,
SHEFFIELD.
Telegraphic Address: KOPROVEN, SHEFFIELD. *Telephones:* 1331, 1332 *and* 1335.

BOILERS
EX STOCK.

MOST MODERN "DISH-END" TYPE.
WITH CORRUGATED SECTIONS.

	W.P.	Shop No.
4 30 ft. by 9 ft. 3 ins. by 160 lbs.		5762/3 & 5928/9
1 30 ft. by 9 ft. 3 ins. by 125 lbs.		5974
1 30 ft. by 9 ft. 3 ins. by 120 lbs.		6027
2 30 ft. by 8 ft. 6 ins. by 160 lbs.		6127/8
1 30 ft. by 8 ft. 6 ins. by 120 lbs.		6026
1 30 ft. by 8 ft. 3 ins. by 120 lbs.		6163
2 30 ft. by 8 ft. 3 ins. by 100 lbs.		5630/31
4 28 ft. by 7 ft. 6 ins. by 120 lbs.		5791 & 5782/4
4 28 ft. by 7 ft. 6 ins. by 160 lbs.		5798/9 & 5756/7

All the above Boilers are built from "Siemens Martin" Acid Steel.
Repairs to all types of Boilers by first-class men. 9406
JOHN THOMPSON
(WOLVERHAMPTON) LTD.,
(WOLVERHAMPTON) ENG.